XEROX

Xerox University Microfilms
Ann Arbor, Michigan 48106

WESTERN AMERICANA

Reproduced from the original in the collection of
U.S. NATIONAL AGRICULTURAL LIBRARY

2
312B

RECEIVED
NOV 4 1908
U. S. Department of Agriculture.

TEXAS DEPARTMENT OF AGRICULTURE.

BULLETIN NO. 3.

PAPERS AND ADDRESSES

BEFORE THE

TENTH ANNUAL SESSION

OF THE

TEXAS FARMERS' CONGRESS

1907.

COMPILED AND ARRANGED
BY
THE COMMISSIONER OF AGRICULTURE,
AUSTIN, TEXAS.

For a copy of this Bulletin apply to the Commissioner of Agriculture, Austin, Texas.

AUSTIN, TEXAS
VON BOECKMANN-JONES CO., PRINTERS
1908

345-408-10m

TEXAS DEPARTMENT OF AGRICULTURE.

BULLETIN NO. 3.

PAPERS AND ADDRESSES
BEFORE THE
TENTH ANNUAL SESSION
OF THE
TEXAS FARMERS' CONGRESS
1907.

COMPILED AND ARRANGED
BY
THE COMMISSIONER OF AGRICULTURE,
AUSTIN, TEXAS.

For a copy of this Bulletin apply to the Commissioner of Agriculture, Austin, Texas.

AUSTIN, TEXAS
VON BOECKMANN-JONES CO., PRINTERS
1908

PREFACE.

The law creating the State Department of Agriculture recognizes the value to the farmer of agricultural information in printed form. The Commissioner of Agriculture is commanded to publish and distribute papers and addresses delivered at farmers' institutes, when they are of a character to promote the welfare of the farmers. It is with pleasure that this department publishes the papers and addresses selected from those delivered at the tenth annual session of the Texas Farmers' Congress, held at College Station, Texas, July 23, 24, and 25, 1907.

The delay in printing these papers is due to the difficulty experienced by the president of the Congress in obtaining the proceedings of the different sections from the several secretaries. The omission of certain papers is due to the same cause, except in the case of those read before the Texas Nut Growers' Association; these have already appeared in Bulletin No. 2, "Pecan Culture," etc., of this department.

The Texas Farmers' Congress was organized at the A. and M. College ten years ago with five participating organizations. This movement had its origin in a desire to better farm conditions. From a small beginning the Congress has enjoyed a steady growth; at the present session sixteen separate organizations carried out separate programs as regular members, while two other organizations, that are not yet members, announced programs.

The interest manifested in this annual gathering of the Farmers' Congress can be estimated from the attendance at this last session when about 800 delegates were present—every one of them having paid his way to get there. Every session of the Farmers' Congress has been held at the A. and M. College; it is the natural meeting place for the Congress; no other place in Texas would answer the purpose quite so well. The delegates sleep in the dormitories. They take their meals in the students' mess hall. The shops and laboratories are open for inspection. They become intimately acquainted with the work the College is trying to do for Texas.

The range of topics discussed at the meetings of the Congress can best be learned by glancing over the table of contents printed at the beginning of this Bulletin, and by reading the papers. The prime end of the program as carried out was to stimulate and to create helpful forces in this State for upbuilding and conserving its agricultural interests.

R. T. Milner,
Commissioner.

Department of Agriculture, Austin, Texas, April 21, 1908.

CONTENTS.

I. General Sessions of the Farmers' Congress.

List of General Officers of the Texas Farmers' Congress.................. 9

First Day—Morning Session: July 23, 1907.

Propagation of Fruit Trees. By E. W. Kirkpatrick and C. Falkner... 10
Closer Relations Between the Press and the Farmer. By Will H. Mays 10
Gathering and Packing Fruits. By, C. A. Hotchkiss, T. C. Nye, C. Falkner, E. J. Kyle, and E. E. Scholl.......... 14

First Day—Night Session: Formal Opening of the Congress.

Address of Welcome. By Charles Puryear.......... 15
President's Annual Address. By J. H. Connell.......... 17

Second Day—Afternoon Session.

The Corn School. By A. M. Ferguson, C. H. Alvord, and C. P. Hartley.......... 22
The Cotton School. By R. L. Bennett.......... 22
How to Keep the Boys on the Farm. By W. J. Spillman.......... 23

Second Day—Night Session.

Election of General Officers.......... 27
Report of Committee on Resolutions.......... 27
Reports of Standing Committees.......... 30
The Birds of Texas. By M. B. Davis.......... 36

Third Day—Afternoon Session.

Object Lessons Devoted to Livestock, Dairying and Bees.......... 40
Our New Department of Agriculture. By R. T. Milner.......... 41
The Farmer. By D. L. H. Bonner.......... 41
Exhibits.......... 43

II. The Texas State Nurserymen's Association.

The Fruit Failure of Texas Orchards in 1907. By Jno. F. Sneed...... 44
The Growing Demand for Ornamentals. By J. B. Baker.......... 44
Some Native Ornamental Plants. By F. T. Ramsey.......... 45
Some Native Texas Trees. By J. S. Kerr.......... 47

III. Texas Corn Growers' Association.

Address of Welcome. By C. H. Alvord.......... 51
The Relation of Soil Types to Particular Crops and Varieteis of Crops, With Special Reference to the Production of Corn in Texas. By J. A. Bonsteel.......... 52
Saving Texas Soils. By John Gorman.......... 56
How the Preparation of the Seed Bed Affects the Stand. By, L. A. Pawledge.......... 59
Selecting Seed for High Yields. By A. M. Ferguson.......... 60
Selecting Ears of Quality for Seed. By Winfield Harpold.......... 63
The Importance of the Shelling Record of Seed Corn. By H. T. Weathers.......... 65
Native vs. Northern Seed Corn. By M. C. Fuller.......... 66
Indian Corn in Texas and New York. By H. Ness.......... 66
Laguna and Other Mexican Corns. By John Gorham.......... 68
Tillage of Corn. By T. B. Headley.......... 69
Why We Grow Grain in Texas. By A. M. Ferguson.......... 73
Successful Corn Cultivation Without a Plow. By J. S. Winfield...... 74
Raising Corn. By Aaron Coffee.......... 76
Cost of Growing an Acre of Corn. By J. L. Quicksall.......... 76

III. Texas Corn Growers' Association—continued.

Selling Corn by Grade. By H. B. Dorsey 78
Corn Growing and Stock Raising. By F. R. Marshall 79
The Use of Grain in a Rational Farming System. By W. J. Spillman 80
Corn Exhibitions 82
Purpose and Value of Score Cards. By C. H. Alvord 83
Promoting the Usefulness of the Texas Corn Growers' Association. By M. B. Yeary 84
Corn Insects. By. A. H. Conradi 88
Fall vs. Spring Oats. By J. W. Mickle 89
Small Grain in Southwest Texas. By Alfred Toepperwein 90
Chances for a Recurrence of the Green Bug. By A. H. Conradi 90
The Johnson Grass Problem. By J. S. Cates 92

IV. The Texas Swine Breeders' Association.

Care of Pigs 96
The Management of Pigs for Breeding. By C. B. Metcalfe 97
Piggy's Troubles. By J. U. Lainhart 98
Feeding Hogs for Profit 99
Green Pasture for Hogs. By J. D. Cotton 100
Is Green Pasture Overestimated in Texas? By J. C. Burns 101
Alfalfa as a Pork Producer. By J. C. Burns 101
Establishing a Hog Pasture. By J. T. Bell 107
Sanitation vs. Disease 107
Cottonseed Meal as a Profitable Hog Feed. By Aaron Coffee 108
Heavy Hogs Unprofitable 109
Replacing the Old Brood Sow 109
The Farmer vs. the Fancy Breeder. By Geo. Frazier 110
The Future of the Hog Business in Texas. By J. A. Blow 110
Possibilities of Hog Raising in Texas. By J. J. Ferguson 112
Cost of Fencing and Equipping a Forty Acre Hog Farm. By. J. C. Hestand 113
The Best Way to Advertise. By J. P. Mouldin 115
The Show Ring; its Object and Purpose. By Tom Frazier 116
Scientific Stock Farming as Taught at the A. & M. College. By F. R. Marshall 116

V. The Texas Beekeepers' Association.

Successful Beekeeping. By F. L. Aten 119
Selecting the Location for an Apiary. By Louis H. Scholl 119
Are Holy Land and Cyprian Bees All-Purpose Bees for the Average Beekeeper? By W. H. Laws 120
Importance of Good Queens as Compared With Other Requisites to Successful Beekeeping. By T. P. Robinson 121
Making Hives at Home. By O. P. Hyde 122
Why I Prefer Shallow Divisible Hives. By Louis H. Scholl 123
Some Short Cuts in Managing Out Apiaries. By W. O. Victor 125
Extracted and Strained Honey Described. By F. L. Aten 126
Comparative Profit in the Production of Extracted, Bulk Comb and Section Honey. By T. P. Robinson 127
Storing Honey and its Tendency to Granulate. By ——. 128
The Effect of Pure Food Laws on Texas Honey Prices. By Udo Toepperwein 129
The Prices of Honey for Texas Beekeepers. By Udo Toepperwein 130
Baby or Larger Nuclei 132
Use Made of the Foul Brood Appropriation. By A. F. Conradi 133
Questions and Answers 134

VI. The Texas Woman's Industrial and Educational Association.

Teach the Girls to be Homemakers. By Miss M. B. Thornton. 136
Modern Conveniences for the Farm Home. By Mrs. J. H. Connell 136
Domestic Inventions That Have Enhanced the Pleasures of Farm Life. By Mrs. Anna McDonald 138

VI. The Texas Woman's Industrial and Educational Association—cont.

Flowers the Years 'Round. By Mrs. V. W. Grubbs....139
What a Woman Can Do With Cement on the Farm. By Mrs. E. M. Barrett....140

VII. The Texas Dairymen's Association.

Cream Separators on the Farm. By B. D. Clement....142
Creamery vs. Farm Butter Making. By M. E. De Tar....143

Appendix—List of Farmers' Bulletins....145

Index....152

I. GENERAL SESSIONS OF THE FARMERS' CONGRESS.

GENERAL OFFICERS.

The following are the general officers of the Texas Farmers' Congress, and constitute its Executive Committee:

J. H. Connell,* President..............................Dallas.
E. W. Kirkpatrick, President..........................McKinney.
T. W. Larkin, Secretary and Treasurer....................Denison.

Vice-Presidents and Executive Committee.

E. W. Kirkpatrick, McKinney, State Horticultural Society.
H. E. Singleton, McKinney, Texas Swine Breeders' Association.
Johnson Robertson, Grandview, Texas Sheep and Goat Breeders' Association.
J. M. Vance, San Antonio, Texas Dairymen's Association.
Rice Dennis, Milano, the Farmer Boys' and Girls' League.
Mrs. R. H. Hayes, Galveston, Texas Woman's Industrial Association.
Jas. Garrity, Corsicana, Texas Division Southern Cotton Association.
E. W. Knox, San Antonio, Texas Nurserymen's Association.
S. A. McHenry, Cuero, South Texas Fruit and Truck Growers' Association.
W. O. Victor, Hondo, Texas Bee Keepers' Association.
C. Falkner, Waco, Texas Nut Growers' Association.
J. L. Quicksall, Waco, Texas Corn Growers' Association.
D. A. Saunders, Waco, Texas Seed Breeders' Association.
E. G. Cloar, Matagorda, Texas Rice Growers' Association.

The following State organizations, together with local and sectional societies, constitute the Texas Farmers' Congress, and hold representation on a delegated basis:

State Horticultural Society.
Texas Swine Breeders' Association.
Texas Sheep and Goat Breeders' Association.
Texas Dairymen's Association.
The Farmer Boys' and Girls' League.
Texas Woman's Industrial Association.
Texas Division Southern Cotton Association.
Texas Nurserymen's Association.
South Texas Fruit and Truck Growers' Association.
Texas Bee Keepers' Association.
Texas Nut Growers' Association.
Texas Corn Growers' Association.
Texas Seed Breeders' Association.
Texas Rice Growers' Association.

---

* Prof. J. H. Connell resigned the presidency February, 1908. Mr E. W. Kirkpatrick was selected by the Executive Committee to fill the vacancy.

FIRST DAY—MORNING SESSION.

July 23.

PROPAGATION OF FRUIT TREES.

Mr. Kirkpatrick has been very successful in budding improved varieties of soft-shell pecans on poorer breeds of pecans and upon the hickory tree. He began the object lesson in the progagation of fruit trees with a few remarks about the selection of the bud, then used the knife to remove it from the bud stick and to insert it in the pecan stock, performing the whole operation so that the audience could see precisely how the work was done. He also showed how the bud should be wrapped with waxed cloth and otherwise protected, and called attention to the care to be given to the sprout and to the tree, illustrating every step with specimens carefully selected beforehand. At the close of his talk a large number of the audience went forward and took a lesson in budding.

Another exhibition in budding was given by Mr. C. Falkner. He favors using glue instead of so much wrapping and tying with strings. He showed some growing persimmon buds which he had propagated. Instead of budding in the early spring, as does Mr. Kirkpatrick, he buds through May, June, and July.

CLOSER RELATIONS BETWEEN THE PRESS AND THE FARMER.

WILL H. MAYES, Brownwood.

A Parisian journal recently told a story of a beggar who presented himself regularly at a certain coffee house with a clarinet under his arm. "Will you allow me," he said in a humble tone of voice, "to play a tune? I am an amateur and but a poor musician at best, and if you prefer giving me a trifle I will spare you the annoyance of listening to me." Every one unhesitatingly felt for a few stray coppers and the musician respectfully withdrew. This he repeated several evenings in succession. At last a young man who had been a regular contributor insisted in a friendly manner that whether good or bad he should give them some music. The man protested that he was but a poor player with a poor instrument. "Never mind that, we want to hear you, give us a tune," demanded the young man. "Well, sir, since you insist upon it," replied the poor fellow, "I will tell you that I do not play at all. I carry this clarinet for the purpose of threatening people with my performance."

While I am not appealing to you for your spare coppers, for you can not rid yourselves of me quite so easily, I fear that you will find me a very poor speaker and will be disappointed in my address, and I carry this manuscript not so much for the purpose of using it on this audience as with the hope that I may hold your attention under the impression that perhaps it may later on reveal something of interest.

Being a practical newspaper man, and also a farmer, though not so practical in that line of business, it is expected that I shall say something to you about that intimate relation which should exist between the farmer and the press. There was a time when people paid for and read a paper for one purpose mainly, to teach them the true political faith of the party for which the paper stood, the news columns being regarded as a mere incident to this greater purpose. Of course, there were a few religious, agricultural and trade papers, from which this was not expected, but they did not receive that patronage now accorded such journals nor the esteem in which they are now held. The newspaper, the paper that found its way into most of the homes and was most closely read by all the family, was expected to be in a way a disseminator of public information, but above all a teacher of orthodox party politics. If it ever proved to be short in anything, it was readily forgiven for leaving out the news, but public sentiment demanded that every issue should contain a clear statement of eternal allegiance to party politics and party leaders. In other words, it was expected to be the organ of party factions and cliques, regardless of what personal views the editor might have deep down in his heart about these measures or men. But the times have changed, and I think for the good of the press and the people. A spirit of broad-minded independence has grown up that is resulting in the purification of party politics and in a more intelligent information on the part of the people. I am not mentioning this to enter upon a discussion of politics in this Congress, which I understand is prudently and rightly excluded, but merely to show how the gradual change in the attitude of the press has worked a corresponding change in the mental processes of the reading public. Where once the ipse dixit of the press was accepted without reservation, provided it happened to be flying the right party colors, its growing independence of thought on all public matters has tended to create similar independent thinking on the part of the people. In truth the reading public has hardly been content to merely keep apace with the press, but has taken a leadership in the creation of public sentiment, which was formerly conceded to be the exclusive prerogative of the few, and the press is now the exponent of the sentiment of its constituency. It no longer occupies the stilted position of ex-officio political crier to the people, but is rather the tocsin of the masses.

It has set the people to thinking, and they in turn keep the press thinking; and a nation is safe when its people think. But it is not to you as component parts of the nation to whom I would speak, but rather to you as individual tillers of the soil, and in that capacity you are becoming even greater students. There was a time, not many decades ago, when a speaker who would have had the temerity to address a body of farmers on scientific agriculture would have been hissed as an ignoramus. They believed the methods of their fathers good enough for them. They tilled the soil merely to live and to keep it together.

I am reminded here of a story I read not long ago. A college student went to the country to work on a farm and was soon afterwards told to wash the family carriage. He noticed a tub filled with water near the pump and asked an old negro farm hand if he thought he might use the water in the tub. "Jim," he said, "what do they use that tub for?" "Don' know, Marse George, jes' 'xactly what dey do use that tub foh." "Oh, pshaw, been here a whole year and don't know what that tub's for. What do they do with it?" "Well, Massa," said Jim, at his wits' end, "I jes' reckon dey jes' uses dat tub foh to keep water in it foh to keep de tub from leakin'." A great many farmers in former days (and some few now), just use their farms to grow things on to keep their farms together. At times they progressed to the ambition of the Illinois farmer, who "raised corn to fatten hogs to buy land, to raise more corn to fatten more hogs to buy more land, to raise more corn to fatten more hogs to buy more land," and so on ad infinitum. But this was too often the limit of their desires.

This is an age of reading and of study. The world recognizes that brain must be mixed with brawn to produce the best results. The man who refuses to keep pace with the progress of the day has nothing left but to become a mere follower and hanger-on in life's procession. The world, the busy working world, has grown too busy to spend much time with voluminous books. It seeks its information largely through the papers. They are published in attractive style; they are edited by men of ability, or by men who are at least in close touch with their readers; they are issued every day or every week; they depend for their influence upon their circulation; and they push their way right into the homes of the land, usually to remain there for all time. They are read more closely than the family Bible, a statement in which many of you will bear me out, and are studied more assiduously than the prayer book. The people want editorial views upon the practical problems of life with which they come in contact every day. If those views bear the imprint of practical common sense they are readily adopted or at least given a trial, but if they are the mere pratings of an idle brain they are accepted by the studious farmer only for what they may be worth. What he wants is something that will help him in his efforts to make a more useful citizen, that will aid him in the proper care and training of his family, that will create a greater interest in the home, and that will assist in a solution of the vexing problems which are constantly arising. In short, the farmer wants a paper which he feels is doing its best to serve his interests in every way possible and that is free from entangling alliances which might possibly dominate it against his interests. If he is satisfied as to this, little does he care for the church or party affiliation of the editor, for he usually has views of his own on these matters, with reasons for the faith that is in him.

Speaking of affiliations reminds me of another story, which, while it may not be entirely applicable, is good enough to tell again, even if you have already heard it. In Colorado where the women have been granted the privilege of voting, a young woman appeared at the polls to exercise her right of suffrage for the first time. Among other questions propounded by the election judges to voters, and which were asked her, was: "With what party do you affiliate?" "Oh, do I have to tell that? Then I had rather not vote, but I don't mind saying before I leave that he is one of the nicest young men I have ever met."

Naturally, the relations between the paper, such as I have described, and its readers become very intimate. With its daily or weekly visits into the home, year in and year out, conditions could not be otherwise. This sense of intimate influence should prompt every editor in the land to put the very best that is in him into his editorial work, and should produce a reciprocal appreciation on the part of the readers. Every well edited paper that goes into your home has a perceptible influence upon your life and upon that of your family, more perhaps than you imagine. It is therefore to the common interest of the country that you should be personally interested in elevating the standard of usefulness of the press, and in this every progressive and sensible farmer can materially assist.

First, place in your homes a number of the best secular, agricultural and religious publications. Read them carefully and encourage your families to read them, though usually where papers are received into the home their contents are readily enough absorbed. Apply such of the practical suggestions as may be deemed advisable to your own affairs, and diligently attempt to profit by them. Don't be afraid to commend the paper or take issue with it in a friendly way. Especially in matters pertaining to the business in which you are most interested feel free to offer your suggestions, criticisms and experiences. There is not a sensible publisher in the land who will object to this; in fact they will all appreciate it, and you will, by stimulating public interest, aid the paper to extend its influence, benefit the people who read it, and at the same time get a little self-improvement, which will help to keep out of the ruts. The newspaper, and especially the agricultural and local paper, should be made the medium for the exchange of views and experiences among farmers. There is practically no competition in farming; there are no business secrets to be kept; no ideas to be copyrighted. The thing that has saved you time, labor or money will likely prove equally helpful to your neighbor or to any other farmer. Let the papers know these things and they will be glad to publish them that others may profit by them. Some people feel a delicacy in furnishing the papers with their experiences because they write poorly, spell badly or express themselves in poor terms. But almost any farmer can tell in plain language what he has learned and the editors are glad enough to get any good item, and, if required, properly dress it up. They do not expect you, with little experience, to write as well as men who have made writing a life business, any more than you would expect them to be acquainted with all the practical details of farming. If you have ever hesitated to send some item to a paper for any of these reasons, let me ask you in the interest of the great body of farmers not to do so again. Every publisher is anxious to keep his paper in such close touch with the people that they will feel a personal interest in it and profit by every issue of it.

Now, just a word more of practical suggestion and I am through. The farmers of Texas do not avail themselves of the business columns of the papers as they should. Except with comparatively few, and they are mostly specialists, farmers do not appear to realize that the advertising columns of a paper can be used by them to advantage. I have known farmers to spend days of valuable time, riding over the country hunting for hands to do some kind of farm work, when a short advertisement in a local paper would have brought quicker and better results, at a nominal cost. I have seen farm tools rot when no longer needed, because the nearest neighbors happened not to want them, when a few cents expended in advertising would have disposed of them at a fair price. I have seen farm products waste because the farmer did not have the time to take them to his nearest town and peddle them around the streets, when a mere pittance spent in advertising would have brought eager customers to him. I have seen stock sell at much less than their worth because the farmer did not have the foresight to advertise them, and thus get in touch with the people desiring such stock. The most successful merchants are those who are the best and most constant advertisers, and I see no reason why the farmer should not profit by examples of thrift in other avocations. The waste from neglecting this means of publicity in Texas alone is something enormous all the while. The farmers of the East are learning the lesson I would leave with you and are greatly profiting by it. Pick up any Eastern paper and you will see notices of stock sales on the farms, of sales of second-hand tools, offerings of surplus hogs, of poultry, of cattle, of bees, of farm seeds, of every conceivable thing which is sold from the farm. It pays these Eastern farmers and it will pay you as well. I know farmers who have been selling their cotton seed at $1 per bushel, while their neighbors across the fence sold the same seed to the oil mill at $10 or $12 a ton. This may appear to you to be shop talk made for selfish motives, but I am talking to you now as a farmer who knows from experience just how helpful advertising can be made to farmers. If the farmers of Texas would only heed this last bit of advice and give the suggestion a fair trial it would be the means of saving them, not merely thousands, but hundreds of thousands of dollars every year. As it is these vast sums are utter waste so far as the farming interests are concerned.

While not bearing directly on my subject I wish to say that as a class farmers are either too optimistic or too pessimistic. They are usually either up in the clouds or down in the marshes. They either see visions of immense wealth or stand in dread of direst poverty. They seldom occupy that middle ground which results in the greatest degree of contentment.

I recently heard Governor Glenn, of North Carolina, tell of a North Carolina darkey who was asked if he was an optimist or a pessimist. "I don't know about dat, boss," was the reply, "but I tell you what I thinks I is. I see dem 'simmons up dar ripenin' on de tree; de udder day I see a nice young 'possum down on de creek, and I know dat 'possum gwine ter eat dem 'simmons and get fat. I see de great big taters down in de field jes' a bustin' de groun', and I knows I gwine ter catch dat 'possum and dig dem taters, and Ise gwine ter—boss, I reckon I jes' am one of dem possumists." It pays to take the cheerful view of things, whatever the conditions may be.

"The inner side of every cloud
Is bright and shining;
So therefore turn your clouds about,
And always wear them inside out,
To show the lining."

I feel like apologizing for delivering an address of this character to the intelligent class of farmers composing this audience. The few thoughts and suggestions offered have doubtless occurred to you time and again, for you are of the progressive, thinking class of farmers. But through you, and the opportunity which the occasion affords, I hope that something said may find its way to some of the many thousands who do not give enough earnest thought to the business, that will cause them to avail themselves of the privileges afforded by the relations which should exist between them and the press. A husband returning home late at night found his spouse still awake and ready to berate him soundly for his dissipation. When he fell asleep his wife was still giving her opinions of such husbands in no uncertain terms. Finally he awoke and again heard his wife's voice and said, "Wife, I want to ask you one question. Are you talking yet or agin?" Lest some of you may recover from the soporific effect of the weather, and this disconnected talk, and ask a similar question, I

close with the statement of that illustrious first citizen, George Washington, who, after an unparalleled career as warrior, statesman and farmer, said, "Agriculture is the most healthful, most useful and most noble employment of man."

GATHERING AND PACKING FRUITS.

The practical work was continued by C. A. Hotchkiss, of Smith county, who showed how he packed fruit for shipping. He went also into the details of picking and handling the fruit until it was put on the train. By his method he claimed that he had shipped 10,000 crates without having one turned down because of bad condition of the fruit. Mr. Hotchkiss had before him the kind of basket he used (a round-bottomed, half-bushel basket), both the four and six-basket crates, besides several varieties of grapes, peaches, apples, and cantaloupes.

Mr. Hotchkiss showed in detail how to pick and pack the fruit. He declared that eight-tenths of the fruit spoiled in shipping was lost through the carelessness of the shipper. He denounced severely, however, the policy of express companies in forcing the fruit man to pay express charges in advance and then refusing to adjust any claims for damage to fruit while en route.

Mr. Hotchkiss stated that there was no crate maker in Texas who understood his business. The Northern crates were good, but were too high in price to be profitable to the grower.

Mr. T. C. Nye, of Laredo, "the onion man of the United States," also denounced the Texas-made crates. "The sample crates are all right, but when the carload lots come you will find them badly made and weighing much more than your contract calls for." Mr. Nye also believes that the ignorance of the shipper of fruit is responsible for most of the losses.

Mr. C. Falkner, of Waco, likewise deplored the poor crates sent out from Texas. He claims to have shipped the first straight carload of peaches from Texas, and he said that he had perhaps shipped more carloads of peaches from Texas than any other man. He stressed the importance of careful picking and packing at the right time. He packs directly from the basket into the crates.

Professor Kyle, of the horticultural department of the College, told how he was training expert packers and pickers from among the students. Last year he sent a company of students to work as common laborers in the packeries in Texas, Arkansas, Missouri, and Michigan. This year the same students are working as expert superintendents in large packeries in Arkansas.

Professor Kyle and Assistant Entomologist Scholl of the College gave a practical demonstration of spraying with different spraying machines, which were placed on the platform. After adjournment the demonstration was continued further on the outside of the building, where the process of spraying orchards was shown, in which barrels and apparatus attached to wagons were used.

FIRST DAY—EVENING SESSION.

FORMAL OPENING OF THE TENTH ANNUAL CONGRESS.

ADDRESS OF WELCOME.

PROF. CHARLES PURYEAR, Dean of the A. and M. College.

Mr. President, Ladies and Gentlemen of the Texas Farmers' Congress:

It gives me sincere pleasure to extend to you the hospitalities of the Agricultural and Mechanical College on the occasion of this your tenth annual meeting. Most heartily do I welcome you to your natal spot for three days of plain living and high thinking. In the ten years of its existence your organization has made a wonderful growth both in numbers, and in influence and power. Beginning with a membership of six societies, you now have eighteen. At first your objects were but little known, and in part misunderstood. Today you are recognized as a powerful facter in the movement to give to agriculture in its broadest sense the position to which its importance entitles it.

In spite of the growing importance of the manufacturing and commercial interests in Texas, agriculture must inevitably hold its place as the dominant interest of our people. And this is true whether we base the comparison on the value of products or on the number of people engaged in the several occupations. The farmers are the bone and sinew of the State; as they prosper or suffer, so prospers or suffers the whole body politic. Agriculture flourishes and merchants, manufacturers, bankers, transportation companies all share in the good times that follow. Agriculture languishes, and all share in the resultant depression.

You are to be congratulated upon the success you have had in seeing your ideas crystallized into laws. Strictly eschewing politics, you have by the lever of public opinion wielded a potent influence upon legislation. Witness among other measures the establishment of a State Department of Agriculture, and the law for feed control. But much remains to be accomplished. In this connection I will mention two matters that seem to me to be worthy of your serious consideration. First, that of the control of insect pests. It is estimated that these enemies levy upon the crops of the United States an annual tax of more than $500,000,000. Of this enormous sum Texas undoubtedly pays her full share. To combat this enemy individual effort is totally inadequate. State action is required. What has been done is altogether out of relation to what is needed. A warfare of this kind costs a great deal of money, but in the protection it affords it repays the outlay many fold. In such a case not to spend is extravagant; to spend is true economy. I may add that by the financial co-operation of public-spirited grain dealers and millers our Department of Entomology is introducing a promising method of control which is absolutely new in the history of entomology.

In the second place, I would refer to the matter of good roads as one of great moment to the farmer. I would like to see this body put itself behind the movement for better roads. If you will pardon me, Mr. President, I would suggest that a lecture on the split log drag be made a part of the program at your next meeting.

The influence of this Congress has been felt not only in matters demanding legislative action but also in matters affecting the practices of progressive farmers. As your President has stated heretofore, you preached diversification and you brought it about. You advocated co-operation, and we have systematic methods of marketing perishable crops on a co-operative basis. You declared the necessity of some provision for storing cotton, and today the State is dotted with cotton warehouses. These facts are encouraging. They foreshadow great results, for the forces that have brought them about have only recently come into play and are rapidly growing in momentum.

To me it seems particularly appropriate that your meetings should be held here. The Farmers' Congress, the Farmers' College. Your work and ours, in a broad sense, look toward the same ends. We both belong to the great body of seekers after truth. Iron sharpeneth iron; and the intellectual thrusts and parries which accompany your discussions will benefit us and you. This institution stands for thorough training in practical science—particularly as related to agriculture and to engineering. Its aim is to send out young men fitted by their training to take a leading part in the material development of the State; to become scientific farmers and horticulturists, prepared to make two blades of grass grow where but one grew before; to become engineers—civil, mechanical, electrical, textile or architectural—men fitted not only to meet demands made upon them, but to create such demand by pointing the way to progress and development. Engineering and agriculture are put upon the same footing, and the student chooses freely between them, but for some reason a majority take the engineering courses; and the records do show that many of those taking engineering are sons of farmers—of unprogressive farmers, perhaps, not members of this Congress. I mention this fact without comment for your consideration.

We point with pride to the records our graduates are making as proof that our efforts are meeting with abundant success. Our men are in constant demand in all lines of industrial activity in this and other States, and in foreign lands. In fact the demand exceeds the supply. The kind of education offered here differs widely from anything that was known fifty years ago. The establishment of the land grant colleges marked an epoch in the history of education. Institutions devoting themselves to instruction in the humanities and the so-called learned professions have always done and are doing a great work. They are to be commended. But they are not for the many. For one man so trained, we need ten trained in practical science. A student of such a college as this receives careful training in those subjects which lie at the foundation of a sound education. But this is not all. He devotes perhaps half his time to learning things which bear vitally upon the practical affairs of life; and upon graduation he finds himself able from the start to "pull his own weight," and he does it. He has been trained to work and he keeps it up. Education of this kind is expensive. Laboratories, equipment, investigations require a large outlay of money. In the matter of appropriations to the college the last Legislature was more liberal than any of its predecessors. For the first time industrial education has received the recognition it deserves. We interpret this as a vote of confidence. But if you will regard it as strictly "in the family" I will tell you that we haven't got all we need. For example, our five dormitories and twelve tents contain in all 183 rooms. This provides properly for 366 students. This year our total enrollment was 515. As a result there was undue crowding. It will be readily seen that even after the completion of the dormitory which is soon to be erected our capacity, allowing two students to the room, will not exceed this year's enrollment. Is this credible? It is certainly not creditable. Applicants were turned away last September for want of room and it is now indicated that the same thing will occur to a greater extent at the opening of next session. But the college is growing. Besides the new dormitory, we are soon to erect an engineering building, a natatorium, a veterinary hospital and an administration building for the offices of the Feed Control. A considerable fund is available for the purchase of live stock for purposes of instruction. Provision has been made for visits to different parts of the State by the Vice-Director of the Experiment Station, who will give lectures and addresses on timely subjects. A two years' course in agriculture has been established for the benefit of mature students who can not afford the time or money to take the regular four years' course. They will devote their time almost entirely to practical subjects and should be enabled thereby greatly to increase their capacity for progressive work.

Reviews of bulletins will be issued in the future, giving their results in popular form, with technical terms largely eliminated. These steps are in accordance with the policy of the college to keep in close touch with the active agricultural interests of the State.

Ladies and gentlemen, the authorities of the college would be delighted to have you make a visit here during the progress of the session when you can have the opportunity of inspecting our work, and I extend to you a cordial invitation to come. But I beg you to understand that I mean this for you individually, not collectively. If you should come as a body we should have trouble with the physical law that no two bodies can occupy the same space at the same time. But come when you can, and we will gladly welcome you. I trust this meeting, so auspiciously begun, may be successful in the highest degree, and that one of its results may be the further strengthening of the ties which should exist between such an institution as this and such an organization as yours.

ANNUAL ADDRESS BY THE PRESIDENT.

BY J. H. CONNELL, DALLAS.

Ladies and Gentlemen:

It affords me sincere pleasure to greet the representatives of eighteen State farmers' organizations in conclave, at this, your tenth annual session. I look into the faces of men and women who have attended every session of this Congress for ten years past. Many of these faithful have attended sessions of their independent State associations for over twenty years past—ten years before this Congress was organized. You come here, not in convention nor in mass meeting, but in the more systematic form indicated by the name "Congress." Composed, as this Congress is, of distinct State organizations of horticulturists, swine breeders, dairymen, nut growers, cotton growers, corn growers and similar associations banded together in one general whole, and each association concentrating its efforts on the advancement of some one line of agricultural thought, your annual meetings do insure the progress of all the varied farming interests of Texas, and as your meetings are a success, to that extent you insure, not only the agricultural prosperity of Texas, but the commercial prosperity of the Lone Star State. No other State has a real Farmers' Congress. In this Texas stands alone. The hope of Texas is now, and ever must be, her 352,000 farms. Every farm has a farmer, and if this farmer produce crops with certainty, and sells at a good price Texas will continue to move grandly forward, and will maintain her position as the pivotal agricultural State of the South and of the nation.

After ten years of close association, I greet those here assembled as the leaders of progressive agricultural thought in Texas and for the entire South. I greet you as the victorious army, flushed with a knowledge of recent hard won fights for:

1. A real State Department of Agriculture at Austin.
2. For the teaching of agriculture in our public schools.
3. For more liberal State aid to A. and M. College.
4. For a purer moral atmosphere secured in casting out the gamblers.
5. For a scalp bounty law, that lacked only the Governor's signature, and we should have had that.

During the past year your work has not gone forward lamely or haltingly, but with confident tread you have placed the flag of the farmer upon the high grounds of prosperity, intelligence and morality.

I greet you as the real educators and benefactors of our time, because you have stirred up such a wise spirit of emulation in the hearts and minds of all farmers' organizations as caused them to band themselves together and make our cause their cause, and we have made their fights our own. Presenting thus a solid front to the common enemy, your committees and your officers have been invincible, their cause being just.

Permit me to accord the credit and the praise due to every member of your general executive committee and to your committees on education and on legislation, who have stood staunchly by your demands during the past twelve months, and have wrenched victory from the jaws of defeat. This service rendered has been absolutely without money and without price to you, but at a great sacrifice of time and money to them personally. Theirs was an unpurchasable service, freely rendered in the name of Texas citizenship. Such sacrifice on the part of the plain citizens of Texas is an honor to the cause of agriculture, and reflects glory upon the State having such citizens.

We, your officers, have learned a new meaning of the word "co-operate" during the past year in the touch of elbows and the firm hand-grasp of the Texas officials of the Farmers' Educational and Co-operative Union. We have fought for days and nights together in the trenches during the past winter the battles of freedom for Texas farmers. They have won and we have won. Texas farmers are the gainers. We have learned, too, the helpful value of the Texas State Grange whose official head has lent us such material support.

In greeting you, I greet many members of these last named organizations who are here to advance and to safeguard the cause of Texas soils, Texas crops, her education and her citizenship. Have we not all of the elements of harmony, cordiality, of good will, of peace, of co-operation and of federation for all the active farmers' organizations in Texas? If we have, let us make the most of it by doing what we can to perpetuate and strengthen these farmers' organizations, these natural allies, so that while each performs its own work in its own way, we shall all, at the same time, be one in purpose and prove ourselves invincible because of this organic harmony. "It is a consummation devoutly to be wished." Why not construct this federation? Are we not builders?

We meet here in general assembly to continue the fight we have made for ten years past. We meet to clinch the victories won, to build up that new State Department of Agriculture, to insure the teaching of agriculture in the schools in a satisfactory manner, to uphold the cause of King Cotton, and every Texas crop, and to consider the new and serious problems now confronting us. You will face and solve these also.

TEXAS SOILS.

The cotton crop of Texas brought our farmers 223 million dollars; a sum sufficient to give every man, woman and child in a population of 3,000,000 people, the sum of $70 each. Our present system of cotton farming, though resulting in a large annual cash income, is extremely wasteful of soil fertility. By adopting better plans of cotton farming Texas farmers can grow just as much cotton as in the past without the loss of these rich lands which are washing away into the gulf with fearful rapidity. As rich lands as ours, as black lands as ours, have been totally ruined by this same system of "all cotton" in only two generations. Such soils produced 40 to 50 bushels of corn per acre forty years ago; today they are so poor that ten bushels is considered a fair crop. Is it not time to call a halt and consider our duty to the blood-bought soils of Texas? Can no system or plan be devised by which that valuable body of information, gathered in years past by the United States Bureau of Soils, operating from Washington, in Texas and every other State, can be introduced in some degree as teaching matters in the schools of Texas? What better can we do at this time than to devise some well digested co-operative plan between the workers in the United States Department of Agriculture and the farmers of Texas which will gradually but surely lead thousands of Texas farmers out of the wilderness of "all cotton" and bring them into the land of family comforts, better farms and better educated children. Every loyal Texan yearns to preserve our wonderfully rich soil. Could we invent such a vehicle, the day of the renter's little box house, surrounded only by a three-wire corral, would soon be a thing of the past in Texas. In its stead will spring up the cosy home surrounded by orchards, vines and good barnes.

Texas soils will be discussed as per program by an expert of national reputation. Your special committee on Texas soils will make its report which will no doubt carry valuable suggestions or recommendations. Are we not builders? Yes,

"That husbandman is wise who knows his field,
And with the tenderest care supplies its need.
Yes, he is wise, and being wise he knows
That as he is so too his field must be;
And as his field and he is, so the State.
Wise husbandman, how bright the future glows!
The Fathers taught us how we might be free,
And being free, you teach us to be great."

EDUCATION.

At every session the Farmers' Congress with all of its associations, has taken advanced ground in educational matters. The report of your committee on education last July has had a far-reaching effect and has crystallized into several laws for the improvement of Texas schools—especially the rural schools. Your continued advocacy of industrial education, and especially of agricultural education, has resulted in more liberal appropriations for the support of the A. and M. College and has added strength to and made popular the idea of educating the children of the farmer for the avocation they must, of necessity, follow.

Finally, in response to your ten-year demands, the State Legislature has made the teaching of agriculture obligatory in all of the public schools of the State except the independent school districts having more than 300 scholastics, and in these excepted schools, the subject may be taught at the will of the boards. This is the greatest step forward in industrial education ever taken by Texas, and while the law in its present form, was not exactly to the liking of your committee on legislation, the central thoughts are embodied therein, and the next Legislature can perfect the law. Certain it is that 600,000 children in our rural schools and villages, will, for the first time, get a knowledge of the dignity and the excellence of agriculture from a school room standpoint, and thus the efforts of the parents to interest and instruct their children in farm matters will be materially supported by the teacher and the work done in the school. Without going into further detail in regard to this important matter, I commend to your careful attention the forthcoming report of your able committee on education.

The Congress not only recommends agricultural instruction in the schools, but during the past year, through the Farmer Boys' and Girls' League, which meets with you every year, a system of school gardens has been carried out. This league has done the actual work in the schools. Fruit trees, roses and flowering plants have been sent to a number of schools in the State, free of cost, for the purpose of making demonstration of the good results that come from planting seeds and trees by school children. I have time in this connection to quote from only one of these teachers, J. W. Houston, of Galilee school, in Walker county, who says:

"1. Agriculture does not conflict with other studies, but rather serves as an incentive and a stimulus in the prosecution of other studies; 2. This work has reached the homes of the parents also, as you will see when I tell you that a nice, neat, commodious school building (costing between $500 to $600), with maps and charts and piano has taken the place of the old dilapidated "one-room shack"—when I tell you that roses and pot plants are beautifying many homes that were heretofore barren—when I tell you that smiling gardens and young orchards are some of the results attained by small farmers who before knew nothing but the proverbial cotton and corn—when I tell you that the people have asked for a summer school in order that a goodly number of young people who were unable to attend school during winter and spring (and also several men farmers, heads of families, have signified their intention of attending) may attend—when I tell you that our school is the educational and social center for our community and also for adjacent communities. Farmers are interested more in fine chickens and hogs than ever before and are grading their stock up."

Now that agriculture is a required subject in the country schools, it seems imperative that all the force of the Farmers' Congress should be directed to making the teaching of agriculture a success. What more efficient support could the Congress give than to arrange to supply fruit trees, flowers and farm seed for planting by the school, and thus furnish object lessons of value to the children and their parents?

The expense of supplying material for these schools has thus far been borne by Farm and Ranch, but it should not be expected, nor is it desirable that any one institution or concern should endeavor to furnish 10,000 rural schools with the materials required. It is possible, however, by concert of action, for this Congress to provide the funds needed for a time, on the strength of the demonstrations of the past two years until the State Department of Education can arrange to take this matter up in a systematic manner.

I therefore recommend that a committee from this Congress be appointed whose duty it shall be to devise ways and means for providing all schools desiring to make such object lessons, the necessary planting materials under the most favorable conditions.

It was my good pleasure to sign the first call for the first meeting of the farmers in convention by State organizations some ten years ago, in April,

1897. The first meeting was held July 13, and since that time you have come annually to this institution, and have measured your success on your own farms by results obtained here, in the field, orchard and laboratory. Beginning with a program of only five State organizations ten years ago, with 300 delegates in attendance, the Congress has now grown to eighteen associations with as many as 2500 in attendance during recent years. The new Rice Growers' Association, the new Seed Breeders' Association, and the State Good Roads Association have asked for admission this year. This Congress is a fruitful mother.

The policy of bringing the people and this college into closer relations has been productive of nothing but good. The farmers feel that this college is and should be the farmers' institution, and you naturally regard with jealous eye, even the apparent neglect of any farming interest. This jealousy springs from love of the institution and from the high regard in which you hold the vocation of farming. The intelligent farmers naturally desire to see agriculture magnified and built up in their Agricultural and Mechanical College and are willing to work to that end.

The efforts of every worker in this Congress have been, and should be, constructive, with reference to this A. and M. College. The college is doing a grand work and should be made stronger. Partly through your efforts more liberal State appropriations have been secured for the institution during the past year. Should we not now strive to induce a larger number of students to avail themselves of the agricultural features of this institution?

But there is today a great gulf existing between the rural schools, the schools attended by the farmers' boys, and admission to the A. and M. College. The town and city boy advances by easy stages from ward school to high school, and then passes quickly into the A. and M. College or into the State University. But not so with the farmer boy. His five months' school carries him through arithmetic by the time he is 15 or 16 years of age. Then he must leave home and attend some town high school, or enter a preparatory college before he can gain admission to the regular courses of the A. and M. College. We realize that the two years' short course in this college is intended to partly obviate this difficulty, but the trouble can not be entirely mended at this end. The source of the trouble is located in the weak country schools. The same difficulty exists in every Southern State. Georgia has realized it and is the only State providing a bridge to span the chasm of ignorance that lies between the country school and A. and M. College or the State University. The last Legislature of the State of Georgia has appropriated money for the establishment of eleven agricultural districts. The State buildings for each school will cost $70,000 or more. The running expenses of these schools is provided for by setting aside the revenue derived from the State fertilizer tag tax, estimated at $6000 a year for each school. The congressional districts concerned, donated a total of $572,000 in cooperation with the State for the establishment of these great high schools. This sum will be expended for the erection of the buildings and other fixed improvements. Each school will have a board of trustees of its own; in all, 146 influential citizens stand directly back of the schools. There will be a four-year course, beginning with about the seventh grade. It is intended that the course of study will articulate with the college course at Athens (their agricultural college), so that the graduates of the agricultural school may readily enter the first or second year classes of the college. Many of the scholars may never attend any college, therefore the students will be given instruction that will enable them to manage their own farms, or to take charge of large estates. Practical work on the farm will be given, as well as shop work, and the course of study will include liberal education in English, mathematics and the other common branches. These schools will be coeducational so that the farmers' girls as well as the boys, may aspire to academic education along industrial lines. The net cost to the student will not necessarily exceed $50 for the nine months. Each will be a feeder to the A. and M. College and will be a State experimental farm.

With the principles of agriculture being taught in every school in Texas, leading to agricultural high schools with liberal courses, located in each congressional district, and a great agricultural college standing at the head of this system of agricultural education, Texas would indeed be well equipped during the next generation to sustain her reputation as the premier agricultural State of America.

THE IMMIGRATION PROBLEM.

We can no longer be blind to the fact that the farmers of Texas have an immigration problem to solve. The recent large appropriation by the United States congress for the establishment of a "Castle Garden" at Galveston, and the great activity of steamship and railway companies in their joint efforts to land immigrants on Texas soil, drawn from every country on earth, should be sufficient to cause us to consider this great question, even though continued outbreaks of violence by members of the oath-bound Black Hand and Mafia societies in our sister State did not warn us to be careful in exchanging our American birth-right for this mess of European pottage. We can not at this time ignore the scarcity of our labor supply, but we must not overlook the economic fact that this scarcity of farm labor is in large measure responsible for the good prices we enjoy today for every farm product. Just so sure as the vacant lands of Texas are suddenly populated by a foreign cotton-growing people, just so surely will your sons and your daughters be forced to accept less for their day's work and thus lower the standard of living set by you and your American ancestors. Do you want that? There is now a general sentiment in this country favorable to making our immigration laws more rigid. The farmers should join in that sentiment. The rules governing the entry of immigrants to the United States have been drawn a bit more tightly in the last six months so that now there are better physical examinations given and the immigrant must have money enough to get away from the port at which he arrives. But at best these are superficial requirements. I recommend the appointment of a special committee on immigration to consider this problem, to render a full report at your next meeting, and in the meantime take such steps as will in their judgment prevent the lowering of our standard of Texas citizenship.

THE FARM PRODUCTS OF TEXAS.

No State in the Union is more dependent on her farm products than is Texas. For that reason every merchant, every banker, as well as the farmer, is directly concerned in the cotton crop, its amount and its price. Every man in Texas is a farmer in fact or by proxy. The growth of the peach sets every nerve in East Texas aquiver with coin of the realm, while the sale of the South Texas onion and melon brings joy to the railroad official as well as to the "picaninny." The value of the Texas cotton crop alone was 31½ per cent of the total for which the South sold her cotton last year. Texas is the pivotal cotton State. We must protect this, our monopoly of monopolies. The Texas corn corp of last year reached 155,000,000 bushels and ranked fourth in value amongst the corn growing States of this country. Texas is the only State in the Union that can afford a State Nut Growers' Association—thanks to this Farmers' Congress. Texas stands alone in an independent organization of the boys and girls of farmers. Texas boasts the only independent Woman's Industrial Association connected with the farmers' work. They are here tonight. Texas is first in honey as well as in cattle and cotton.

But time would fail me to tell of all the grandeur and glory of Texas farming interests; allow me to call attention to the growth of the shipments of fruits and vegetables since this Congress was organized, and this may be taken as some measure of your influence in meeting here from year to year and popularizing this new industry. Complete figures for shipments for ten years over all railroads in Texas are not to be had. I therefore take one road's record as a safe index:

The growth of shipments of fruits and vegetables over the Cotton Belt in Texas for ten years past is as follows: In 1898, 257 carloads; 1899, 294 cars; 1900, 323 cars; 1901, 429 cars; 1902, 1401 cars; 1903, 912 cars; 1904, 1538 cars; 1905, 1405 cars; last year, 1809 cars. Surely the organizations laboring for our fruit and vegetable interests have here their reward.

I can allude to the great and vital problems confronting the farming interests of Texas only briefly at this time and stir up your minds by way of remembrance in hope of putting the intellects here gathered on edge that you may rightly discern the true from the false and take such stand for the future as you have always done in the past.

Thanks to the efforts of your committee on general program and to the presidents and secretaries of all the State associations, you have before you for discussion the most complete array of diversified agricultural subjects ever spread for the intellectual feast at any meeting of farmers. May each and every association and every man and woman here present do their full duty. Let us hold high the banner of progressive farming in this new era that has already dawned for the "man with the hoe," remembering that:

> "When a deed is done for freedom,
>   Through the broad earth's aching breast,
> Runs a thrill of joy prophetic,
>   Trembling on from east to west,
> And the slave, where'er he cowers,
>   Feels the soul within him climb
> To the awful verge of manhood,
>   As the energy sublime
> Of a century, bursts full blossomed
>   On the thorny stem of time."

SECOND DAY—AFTERNOON SESSION.

THE CORN SCHOOL.

This session was devoted to object lessons in corn and cotton culture. The corn school was in charge of A. M. Ferguson, of Sherman, assisted by C. H. Alvord, Professor of Agriculture, A. and M. College, and A. H. Conradi, State Entomologist, and C. P. Hartley, corn breeding expert of the United States Department of Agriculture. The cotton school was under the direction of R. L. Bennett, government cotton expert.

The germinating seed, development of the root system, growth of stalk, suckers, tassels and silks, maturing ears, shank, shucks and grain, corn insects, and qualities of value in ear and grain, were all discussed and illustrated; questions asked and answered. Professor Alvord's illustration of the different varieties of corn exhibited on the stalk was especially instructive. He urged the selection of low stalk corn planted closer together in preference to high, good looking corn with little yield.

THE COTTON SCHOOL.

Professor Bennett exhibited specimens of stalks of growing cotton that exhibited the differences in varieties and types. He made plain his idea of the ideal stalk, boll and lint for boll weevil districts. The following summary of his experiments is copied from Bulletin No. 79, Texas Agricultural Experiment Station:

"The results of this cotton breeding show that the cotton plant must have the following qualities:

"For Early Fruiting.

"The first fruit limbs must be low—not higher than the fifth joint above the seed leaf joint.

"Primary or wood limbs must be low—the first not above the fifth joint, and not exceeding four in number is desirable.

"For Rapid Fruiting.

"The joints on the main stem, fruit limbs and primary limbs must be short; not to exceed two or three inches is desirable.

"Fruit limbs should grow in succession at each joint of the main stem and primary limbs should be continuous in growth for continuous fruiting.

"For Productiveness.

"The bolls should not be less than one and one-half inches in diameter.

"The per cent of lint to seed cotton should not be less than thirty-three and one-third.

"The rate of growth is very important and, therefore, the larger the plant of the type, the greater is its inherent rate of growth, its earliness, rapidity of fruiting and yield."

HOW TO KEEP BOYS ON THE FARM.

W. J. Spillman,
In Charge of Farm Management Investigations, U. S. Department of Agriculture, Washington, D. C.

The average farmer in the United States has an income about equal to what he would get if he hired out as a farm laborer at current wages of the country. Is it any wonder that intelligent young men and women are leaving the farm? When I contemplate the condition of the average farmer, the fact that in most sections of the country the soil is becoming poorer all the time because no attention is given to maintaining fertility or building it up, and the further fact that most of our bright boys and girls are leaving the farm, I wonder how long it will be before the American farmer will sink to the level of the peasantry of Europe. That he will do so in time seems to be unquestionable unless there is a change in the course of events. We have heard a good deal said about methods of stopping the flow from the farm to the city. I want to register my protest against compelling any boy to stay on the farm when he can do better in the city. At the same time I think the boy ought to be kept on the farm, or at least a good proportion of our boys; but we must keep him there not by force but by making it possible for him to do better on the farm than he can in the city, and this is the only legitimate way of stopping the movement from the farm to the city. Can this be done? Can we make it possible for a young man just out of school to do better for himself on the farm than he can do in the city? I don't know whether this can be done or not; but let me tell you some of the things which make me believe it can be.

I have already told you what the average farmer is doing. Now let me tell you why he is not doing better. In the first place, the average man does not have much ambition. This is true of all classes of people. The average man is hunting for some way of making a living without hard work, and such men make failures at whatever they undertake. There are a number of callings in the city that to a country boy look like light work, and they are; and they are filled usually by light-headed young fellows who seldom rise any higher than the most subordinate positions. A great many farmers live poorly because they do not put forth the proper effort to live better. More important, however, than the lack of a disposition to work is a lack of knowledge of the real principles of farm management. A good many farmers work very hard. In fact, some of them work entirely too hard to make a success. The man who puts in fourteen hours a day at hard manual labor regularly will never make a big success at anything; and this is just as true of a farmer as it is of anybody else. The most successful farmers I have ever known were men who did very little of their own farm work, except the brain work.

Now, let us know what a few of these men who use their brains, and use them to good advantage, are doing on American farms. You have already heard of the wonderful little thirteen-acre farm near the city of Philadelphia conducted by a minister of the gospel, who retained his pastorate of a suburban church, and developed this little farm into a dairy farm that brought him a net profit of over $2000 a year. The owner of this farm was thoroughly posted on the agricultural literature of the day, and is now one of the leading farmers' institute specialists in this country. He was also a man who could perceive clearly the problems which confronted him, and he went to work in a practical way to solve these problems. Although he began farming when he was forty-one years old, he made a wonderful success. He hired most of his work done, because he needed his own time for thinking out the problems of his farm, and he never would have made this success had he not taken time to think out these problems.

Here, again, is Mr. H. L. Blanchard, of the State of Washington, a merchant who lost his money trying to develop a manufacturing business and whose health went with his money. At thirty-six years of age he went literally into the tall timber. He bought eighty acres of timber land, every cent of it on credit, from people who had confidence in his integrity and ability. He and his family cleared this land, beginning nineteen years ago. They now have seventy acres in cultivation, and have one of the very best farms in that State. They have never hired any labor except one man six months to help out in clearing the first year. They go to work at 7 o'clock in the morning, and they get through everything by 6 o'clock in the afternoon, and have always done so. Last year Mr. Blanchard's farm brought him in a little over $4700 with no labor bills to pay. Mr. Blanchard is one of the highest authorities on farming in his State. He is the editor of a department in one of the farm papers out there, and is one of the leading institute speakers of the Pacific Northwest because of his profound knowledge both of the science and the practice of farming.

I may cite one more instance, though I could cite many. Mr. W. H. Rowe, of Northern Illinois, ten years ago began to work out the problem of managing hogs on his farm. In ten years he has doubled the yield of his crops, and has bought and paid for another farm as large as the one he lives on. Last year he bought still a third of the same size. This is not all yet paid for, but will be within a year or two. Mr. Rowe talked to me about the scientific side of farming as intelligently as any professor of agriculture in this country could have done.

Now, what do these instances I have cited have to do with the prob'em before us? They have everything to do with it. They point the way to the solution of the difficulty. The trouble with our farmers is that they do not know how to make the farm pay a big income. Now we must remedy this difficulty if we are going to raise the standard of living on American farms. How shall we do this? I am not sure that the remedy I have to propose will be efficient, but I have faith enough in it to urge a fair trial for it.

OUR SYSTEM OF EDUCATION.

For our city population we have developed a magnificent system of education in this country. This system consists, first, of the primary and grammar grades, the so-called common schools. Above this we have a splendid system of high schools; and above the high schools we have our State universities and many other institutions of learning of similar grade. The subjects taught in these schools and the manner of teaching them have changed very little since the system was first developed. There has been some improvement in methods and some addition of subject matter. This system of education was developed in England some three centuries ago, and had for its object the fitting of the children of the leisure classes for positions in society. It accomplished this purpose admirably. We have adopted this system in America, although we are supposed to have no leisure classes, and we have applied it to our own children, to the children of the colored race, and even to the children of the Indians of our Western plains. It has made gentlemen of leisure out of many of them.

Fortunately, this system of education happened also to be a very good means of giving the necessary preliminary training for the so-called learned professions—law, medicine, the ministry, and the teaching profession. Because of this tendency of our educational system these professions have always been badly overcrowded. In recent years engineering subjects have been introduced into our higher institutions of learning, and they are now beginning to supply the country with a lot of well equipped young engineers. The remarkable success of these men has shown the wisdom of the institutions which have established engineering departments. They have had an important influence on the development of industries in this country. The establishment of engineering courses in the higher institutions has led to sporadic efforts to develop industrial high schools, and to some extent the introduction of industrial education in the common schools in the cities.

Now, what has our system of education done for the American farmer? Our common schools in the country teach nothing that does not tend away from the farm, either by reason of the subject matter taught or the methods of teaching. Generally speaking, there is no attempt to correlate the instruction in these schools with the life interests of our farming population. Is it strange, under these circumstances, that the boys and girls who have an ambition for an education leave the farm? It looks as if we had deliberately planned to take them away from the farm and thus impoverish good communities by taking from them the best they produce. This condition has long been recognized. The first serious effort to remedy the difficulty was taken by Congress in 1862 when it provided for an agricultural college in every State in the Union. We have had now nearly a half century of experience with these agricultural colleges, and we are beginning to learn what their function is and must be. At one time, and in some quarters even at the present time, the agricultural colleges were criticized for not sending their graduates back to the farm.

There are 352,000 farms in the State of Texas. In order to provide each of these farms with an agricultural college graduate to run it, once every twenty-five years, the State Agricultural College of this State would have to graduate from its agricultural department 14,000 men every year. Your agricultural college has been doing a lot of good work, but it can not, and it never will, supply the demand for educated farmers in this State; nor will any other agricultural college ever accomplish this. It is an absolute impossibility. In fact, this is not the function of an agricultural college. It is not the function of a university to train clerks for dry goods stores. We have seen that it is the function of these institutions to provide us with men in the learned professions. So it is the function of the agricultural college to provide us with the so-called varied professions in agriculture—to provide teachers, experimenters, editorial writers, and other agricultural leaders. It is true that many of these graduates will prefer farming to any other occupation, partly because of the attractiveness of the business and partly because to the man who understands farming it is an exceedingly profitable business; but the agricultural colleges will never graduate enough men to supply the demand for educated farmers. Where, then, shall we get them? The answer to this question seems to me to be perfectly clear.

Let us glance briefly again at our system of agricultural education. First, we have the common country schools of somewhat lower average grade than the elementary schools in the cities. Next, we have the agricultural college, which is of uncertain classification. In some States the agricultural college is of the same grade as the State university; in others it begins where the high school ought to begin, but having pupils more mature than the average high school, and therefore capable of more rapid advancement, the agricultural college is a kind of cross between a high school and a college. We have already seen that it is a physical impossibility for the agricultural college to provide instruction for all the men who are going to run the farms in this country in the future. Now, let us do for our agricultural population what we have already done for the cities. First, let us make our common schools as good as the elementary schools in the cities. Let us introduce school garden work and any other study under which head we can teach all of agriculture that can be taught in the public schools. We can at least, in these schools, give the children some inkling of the wonderfully interesting things to be found on the farm, and inculcate a thirst for more knowledge of agricultural matters. Then let us build a system of agricultural high schools in which, in addition to mathematics, language, and the sciences, we shall teach the practical side of agriculture. Then let our agricultural colleges become real agricultural universities in which the science of agriculture is taught and in which we prepare our agricultural investigators and our agricultural teachers. It will keep an agricultural college mighty busy to turn out enough men and women to teach agriculture in the high schools and the common schools of the State and to supply the demand for trained investigators in agricultural sciences.

Several States have already made an attempt in this direction, some of them with marked success. Minnesota's wonderfully successful agricultural high school at St. Anthony Park has shown that such a school, properly conducted, will send the boys and girls back to the farm and send them back full of enthusiasm, and thus have an important influence on the agriculture of the State. Wisconsin is building agricultural high schools, so is Nebraska. Alabama is making the attempt. But the State of Georgia has taken a most advanced position in the matter of agricultural high schools. She has provided for eleven real agricultural high schools equipped and manned for teaching agriculture. These schools will be in operation this winter, and when they begin to turn out graduates the farms of Georgia will know it. The State Agricultural College of Georgia will have material to work on. The great danger in attempting to establish these agricultural high schools is that we shall go at it in a half-hearted manner and establish a lot of schools which make a mere pretense of teaching the practical side of agriculture. I hope that everyone who is interested in this subject will send to Prof. Jos. S. Stewart at Athens, Ga., for the curriculum which has been adopted for the agricultural high schools of that State.

When Texas undertakes to build these schools, I hope you will put just a little more of the practical work in them than Georgia has done. For the first two years of this course the student should devote three hours a day to practical work in a commercial plant. There should be about four commercial establishments connected with the high school, one a dairy farm, say, of 60 acres, well equipped and so run as to make all the money it is possible for a dairy farm to make. Then there should be an orchard and truck farm with one professor who is charged with the responsibility of its management. There should be a large poultry plant run for the purpose of making money. Then there should be a general farm with some beef cattle, some sheep, and some hogs, and with the common crops of the country. These four plants should all be run as commercial enterprises, and every lick of work in everyone of them should be done by the high school children during the first two years of their study. Every minute of time they put in this practical work should be under the immediate supervision of a trained instructor, and they should be graded more carefully on the practical work than on anything else, because it is the most important part of their education. At the end of these two years a boy should know how to milk a cow better than any farmer in Texas knows today; he should know how to prune a tree, and how to pack a box of fruit for shipment. During the third year the practical work of the high school student is that of the instructor of the first and second year students. During this year the student learns how to manage others—one of the most important things that a young man has to learn. During the fourth year, the student should make working plans for everyone of these four industries, and for a part of the year he should be the actual superintendent of each of them in turn.

Now when a boy graduates from a high school of this kind, he not only has open to him the door of opportunity in every great institution of learning in the country, but in addition he has what the city boy has not—the door of opportunity wide open to him on the farm; and he can go to the farm and can do better financially there than he could do in the city. When we are able to do this for the country boy we will hold him on the farm, and not until then.

SECOND DAY—NIGHT SESSION.

ELECTION OF GENERAL OFFICERS.

Sam H. Dixon, of Houston, and J. H. Connell, of Dallas, were placed in nomination for president. A rising vote showed a majority favoring Mr. Connell.

T. W. Larkin, of Denison, was nominated and elected secretary-treasurer without opposition.

The following vice-presidents and executive committeemen nominated by the several organizations were duly elected, towit:

State Swine Breeders' Association—H. E. Singleton, McKinney.
State Sheep and Goat Breeders' Association—Johnson Robertson, Grand View.
State Horticultural Society—E. W. Kirkpatrick, McKinney.
State Dairymen's Association—J. M. Vance, San Antonio.
Texas Woman's Industrial Association—Mrs. R. H. Hayes, Galveston.
Texas Bee Keepers' Association—W. O. Victor, Hondo.
South Texas Fruit and Truck Growers' Association—S. A. McHenry, Cuero.
Farmer Boys' and Girls' League—Rice Dennis, Milano.
Texas Division Southern Cotton Association—Jas. Garrity, Corsicana.
Texas Nurserymen's Association—E. W. Knox, San Antonio.
Texas Corn Growers' Association—J. L. Quicksall, Waco.
Texas Nut Growers' Association—C. Falkner, Waco.
Texas Seed Breeders' Association—D. A. Saunders, Waco.
Texas Rice Growers' Association—E. G. Cloar, Matagorda.

REPORT OF COMMITTEE ON RESOLUTIONS.

1. FAVORING A SEED CORN TRAIN.

The Texas Corn Growers' Association requests the Texas Farmers' Congress to join them in asking the co-operation of the railroads, the A. and M. College, the various bureaus of the U. S. Department of Agriculture and the Texas State Department of Agriculture in equiping and running a seed train in Texas during the coming winter.

2. FAVORING A STRONG STATE DEPARTMENT OF AGRICULTURE.

Whereas, views favoring a strong Department of Agriculture have been expounded for years by the members of this organization, and ringing resolutions adopted by the Famers' Congress demanding the reorganization of the present Department of Agriculture so as to make it in fact what it now is in name only; and whereas, these views were reiterated and the resolutions renewed at the ninth annual meeting of this Congress in July, 1906, and so effectively presented to the Democracy of Texas as to secure their incorporation in the platform adopted by the State Democratic Convention in the month of August following.

Whereas, the law that was introduced in the Thirtieth Legislature, having for its object the creation of a separate and distinct Department of Agriculture in accordance with the platform demand, encountered considerable opposition during its passage; and whereas, to forestall any future opposition to the new Department of Agriculture, the friends of the Department introduced, and both houses of the Legislature passed unanimously, a joint resolution, submitting to a vote of the people the question whether said Department of Agriculture shall be incorporated in the fundamental law of the State;

Whereas, the amendment to the Constitution proposing this change is to be submitted, with others, and to be voted on on the first Tuesday in August next, which day is close at hand; therefore be it

Resolved by the members of the Texas Farmers' Congress in annual convention assembled, That we endorse and approve of said amendment to the Constitution, and urge all persons interested in the improvement and development of the great agricultural interests of Texas to support said amendment and to vote for it.

3. FAVORING THE UNITED STATES BIOLOGICAL SURVEY.

Whereas, Congress has directed the Secretary of Agriculture to investigate and report to what extent the work of the Bureau of Biological Survey of the United States Department of Agriculture "is of practical value to the agricultural interests of the country," and

Whereas, The Biological Survey has for several years past conducted investigations in Texas to ascertain the distribution of native animals and plants for the purpose of mapping the natural life zones where certain crops can be grown to the best advantage; has studied the food habits of birds and mammals for the purpose of ascertaining which species are most beneficial to the farmer and in so doing has discovered more than forty species of birds which destroy the boll weevil; has furnished facts and figures showing the necessity for preserving these and other valuable birds and has assisted our people in their efforts to secure adequate protection for the birds and game of Texas. Now, therefore, be it

Resolved, That the Texas Farmers' Congress regards the work of the Biological Survey already done in Texas as of the greatest value to the agricultural interests of this State and, in view of the importance of the problems confronting the farmers both here and elsewhere, requests the senators and representatives from Texas in Congress to make every effort to secure larger and more adequate appropriations for these investigations so that the work undertaken by the Biological Survey may be greatly increased in this State and its usefulness extended into wider fields of research ultimately embracing the entire United States. In support of this resolution we present the following facts:

1. The work of the Biological Survey is prosecuted along lines laid down by acts of Congress and includes investigations relating to the geographical distribution of animals and plants, the economic relations of mammals and birds to agriculture, preservation of birds and game, and the supervision of importations of foreign birds and mammals.

2. No part of the work entrusted to this Bureau is of more importance to the practical progressive farmer than the mapping of the natural life zones of the country and their correlation with the crop zones. The mapping of these zones is still incomplete, but when they have been outlined for the entire country as they have been for certain regions, the farmer will be saved many costly experiments by having a ready practical guide to the crops most likely to prove successful in any given locality.

3. The data collected by the Biological Survey is accurate, varied and valuable. The publications of this Bureau should be distributed far more widely in this State so as to be available, not only for our universities and colleges, but for teachers in the public schools, farmers, and persons of all classes who may be interested in them.

4. Among its publications this Bureau has issued one entitled a "Biological Survey of Texas," illustrated with maps showing the life zones, and the distribution of the mammals and reptiles of the State. The extensive data on birds now in the possession of the Bureau should be similarly published to the end that our farmers may have a comprehensive, accurate and convenient report concerning the birds of the State and their value as destroyers of the cotton boll weevil and other insect pests; and be it further

Resolved, That a copy of these resolutions be forwarded to the Secretary of Agriculture, Washington, D. C., and to each of the senators and representatives of Texas in Congress.

4. THANKING COMMISSIONER MILNER.

Resolved, That it is the sense of the Texas Farmers' Congress that we appreciate the co-operation extended to this organization and its allied associations by the Hon. R. T. Milner, Commissioner of Agriculture, in printing the proceedings of the Texas Farmers' Congress and assure him that each member of these organizations will lend their personal support in holding farmers' institutes in this State, and in building up the State Department of Agriculture that will prove serviceable to every farmer in every county in Texas.

5. CONCERNING COMPILATION AND PRINTING OF PROCEEDINGS.

Resolved, That the minutes and the transactions of the Texas Farmers' Congress and the State associations forming the Congress be compiled and prepared for printing before August 10th, and that such minutes and transactions be furnished the President of the Congress for editorial revision in order that the book of the proceedings may be promptly printed by the State Department of Agriculture while the interest in the work of this session is fresh in the minds of the public.

6. FAVORING IMPROVEMENT DISTRICTS.

Whereas, There will be presented at an election to be held in August, a proposition to amend the State Constitution so as to enable cities of over 5000 population to create improvement districts and by majority vote of the property owners of such district when formed, make certain public improvements and charge the cost against abutting property, and to enable political subdivisions of counties to levy a special tax and issue bonds for the improvement of roads within such districts; and

Whereas, The adoption of these amendments will pave the way for great progress, in the way of public improvements, the lack of which have been a serious menace to our towns and communities, therefore be it

Resolved, That the Texas Farmers' Congress in general session endorse the above mentioned amendments as proposed, and urge their adoption.

7. INDORSING THE EDUCATIONAL REFORM MOVEMENT LED BY V. W. GRUBBS.

Resolved, That we fully indorse the great educational reform movement inaugurated and led by Hon. V. W. Grubbs, and that we commend the same to the favorable consideration of all the people of this State.

8. INDORSING VARIOUS MOVEMENTS FOR IMPROVING THE AGRICULTURAL CONDITION OF TEXAS.

Resolved, That this Texas Farmers' Congress has heard with much interest the valuable address on Texas Soils, delivered by Dr. J. A. Bonsteel, Soil Expert of the Bureau of Soils, United States Department of Agriculture, and we thank him for the plan of co-operation proposed in furnishing the schools of Texas with samples of soils by Congress, and we recommend to the Committee on Education of the General Farmers' Congress that they co-operate with Dr. Bonsteel in securing these exhibits and soil maps for the schools of the State, and offer to co-operate with other branches of our great Department of Agriculture at Washington, with the State Department of Agriculture at Austin, the State Superintendent of Instruction and the A. and M. College in furnishing object lesson materials for work in the schools of this State as rapidly as such materials can be obtained. We further recommend that a committee be appointed to provide seeds for forage crops, vegetables, farm crops, fruit trees and of farm shrubs to plant under the supervision of the teachers of this State, as has been done in continuation of the plans already successfully carried on under the supervision of the Farmer Boys' and Girls' League, and that the services of the Committee on Education be placed at the disposal of the State Superintendent of Instruction, in the matter of supplying such seeds, plants and trees to such of the 12,000 rural schools of the State as may desire this practical and instructive help.

9. ACKNOWLEDGING COURTESIES EXTENDED TO THE FARMERS' CONGRESS.

Resolved, That the Texas Farmers' Congress offer this expression of the sincere appreciation of this body to those who have labored so faithfully for the success of this event; to the railroads for the liberal reduction in rates, enabling the farmers throughout the State to attend and partake of this great feast of information; to the press for the faithful reports of the proceedings, embodying valuable information for all who read. To these and many other tireless workers for agricultural advancement our thanks are due.

E. W. KIRKPATRICK, McKinney,
T. C. NYE, Laredo,
J. E. BABCOCK, Lometa,
C. A. WALTON, Victoria,
R. R. DANCY, Houston,
Committee on Resolutions.

REPORTS OF STANDING COMMITTEES.

1. REPORT OF COMMITTEE ON PRINTING.

We, your Committee on Printing, are pleased to report that the proceedings of your last session have been printed and distributed in a book of 210 pages, which contains the discussions edited from stenographic notes and the papers prepared for the several associations and the general sessions. These discussions and papers constituted the most practical and progressive facts ever printed in one volume on the varied agricultural interests of this State. These books have been distributed at the nominal cost of 25 cents per volume. We have secured from advertising and sale of proceedings $343.17, and have due from various sources $107.28. We estimate that these amounts will cover the cost of printing the proceedings and the official programs.

Your committee has considered the matter of printing the proceedings of this session and after consultation with Hon. R. T. Milner, Commissioner of Agriculture, recommend that the Congress consider the plan he will lay before the Congress.

2. COMMITTEE ON SOILS.

Your special committee appointed in accordance with recommendation of last year's session submit the results of their deliberations in the form of the attached resolutions, which are recommended for adoption by the general assembly.

Whereas, The greatest source of wealth in the State of Texas consists of Texas soils; and

Whereas, The proper appreciation of the soil resources of the State, and a proper use of these resources depends upon the understanding, by the people of the State, of the character of Texas soils, the crops each is best suited to produce, and the best methods of cultivation; therefore be it

Resolved, That it is the sense of the Texas Farmers' Congress that the subject of soils should be taught in the public schools of Texas as a basis for the agricultural education provided for in the enactment of the Thirtieth Legislature providing for the teaching of agriculture in the public schools, and be it

Resolved, That the Bureau of Soils of the U. S. Department of Agriculture be, and hereby is, requested to co-operate with the State in furnishing a Soil Expert who shall aid in applying the results of soil survey work to the needs of instruction in the public schools; and it is further

Resolved, That a copy of these resolutions should be furnished to each United States senator and to each representative from the State of Texas in the Congress of the United States.

3. REPORT OF COMMITTEE ON EDUCATION.

Texas people are firmly and from the beginning pledged to the support of a creditable public school system. In 1836 when the Declaration of Independence from Mexico was proclaimed, it was declared for the first time in the world's history that the failure of the general government to provide an adequate public school systm was a just cause for revolution. Responding to this sentiment the framers of the early republic of Texas set aside a part of the public domain which was to form the foundation trust for the exclusive benefit of the public school system of the republic. On this we have depended very largely for the support of our public school system. Magnificent though our large endowment is, it makes but a poor provision for the 869,864 school children in Texas, of which about 75 per cent are in the rural districts. This endowment with subsequent additions, including moneys derived from other sources only yields about $5 per capita of scholastic population.

This endowment has not and does not give promise of ever being sufficient to adequately support our schools on a plane of excellence attained in other States.

In ordinary business lines reflecting material progress, our advancement has been great, as instanced by the rapid development of many of our industries, but in making provision for our schools, the basis of our future social and material welfare, we have not kept pace with our sister States. It is with deep humiliation that we acknowledge that in the essential elements of school progress we are backward. We ask the thoughtful attention of all patriotic Texans, men and women, to these facts:

1. In the showing of length of school term Texas stands 38th from the highest, having only 117 days. In the rural schools the term is only about 100 days.

2. There are thirty-six States that spend more money per capita on schools than Texas. Texas spends $1.84 per capita, of which less than half is raised by taxation. The average for the United States is $3.36. Indiana raises three times as much per capita by taxation as Texas.

3. In the amount expended per pupil Texas stands 38th from the top. The average for the United States is $24.14, while in Texas it is $13.42. Twenty-three States expend more than twice this sum, and four States more than three times this sum. Texas common schools expend less than $7 per pupil.

4. Arkansas allows common school districts to levy 70 cents on the $100 for schools; Ohio requires every school district to levy 80 cents on the $100. In Texas, common schools are allowed only 20 cents on the $100, and in independent districts the maximum is only 50 cents. These antequated shackles should be removed. The State of California with no endowment furnishes not less than $7 per pupil and requires the county to furnish not less than $8 per pupil.

5. The foundation of a school is the teacher. Character, scholarship and experience are the fundamental requirements for good teaching. To secure these qualities the remuneration to teachers should be sufficient to encourage men and women of character to enter the teaching profession as a life work. Uncertain tenure in office and low yearly salary are serious obstacles in our school policy. Ordinary labor, requiring no nonproductive experience, commands from $20 to $30 per month, while the school teacher, as shown in the last report of the State Superintendent of Public Instruction, who must spend from eight to fifteen years in preparation, earns an average annual salary of $262 for white teachers in Texas, equal to an average of $26 per month, to cover all expenses of living and attendance on normals, etc. In the rural schools the annual salary is about $150.

The average teaching experience of Texas teachers is limited to less than three sessions.

After this introspection of our past efforts we ask you to look to the future and commit the united sentiment of this body, the Texas Farmers' Congress, to these principles:

1. We favor the development of the teaching profession. We should strive to so finance our schools that we can pay salaries sufficiently remunerative to encourage large numbers of capable men and women to make school teaching a profession and a life work. We need the character, the scholarship, experience and zeal of the old schoolmasters.

2. It is our judgment that greater care and discretion should be exercised in the selection of school trustees, county superintendents and members of the Legislature who are the supreme directors and guardians of our educational

policies. They should be men who from patriotism, reinforced by competent learning, are pledged to the upbuilding of our school system.

3. We favor the strengthening of the power and influence of our county superintendents in the administration of rural schools. While our trustees are men of strong practical judgment, they need the advice and assistance of expert, trained educators in the employment of teachers and in the expenditure of school moneys, and the younger teachers need the authoritative counsel of a competent county superintendent. We favor the consolidation of weak, one-teacher schools where practicable, and urge upon all citizens a study of the advantages of a strong, well graded and supervised school, as compared to the disadvantages of small, isolated one-teacher schools.

4. We ask that our Legislature submit to the people a constitutional amendment placing the county schools under the administration of a County Board of Education with funds raised by county taxation, as formulated by the State Teachers' Association and indorsed by the last State Democratic Convention. We also want common schools to have the privilege of levying more than 20 cents on the $100 valuation.

5. That the congratulations of this, the Texas Farmers' Congress, be extended to the last Legislature for making agriculture a required subject in the public school course of study. We deem it highly desirable that at the earliest possible moment, liberal provisions be made, whereby our teachers may acquaint themselves with the method and teachable matter covered by this subject. To this we would specifically ask that generous provision be made for the teaching of agriculture in all of our normal schools and urge county superintendents of schools to provide instruction for teachers in methods of teaching agriculture.

6. The Farmers' Congress invites the various bureaus of the United States Department of Agriculture and the officers of the State Experimental Stations to co-operate with the proper authorities in the State and of the Farmers' Congress in devising and formulating plans whereby the knowledge they have gained concerning soils, crops, livestock, insect pests and fungous diseases of Texas can be utilized as a basis for the teaching of agriculture in the common schools.

7. We commend the enterprise of the citizens of the State of Georgia in establishing an adequate system of agricultural high schools, the primary object of which is to prepare the farmers' children for the duties and activities of rural life and which shall incidentally bridge the chasm which now exists between the country schools and the higher institutions of learning in the State, especially the A. and M. Colleges.

8. We ask that in the development of the newly created Department of Agriculture special attention be given to the reinauguration of a system of farmers' institutes and we urge that it be planned on a liberal scale.

J. S. KERR, Chairman,
A. M. FERGUSON,
T. P. ROBINSON,
S. A. MINEAR,
MRS. R. H. HAYES,
F. R. MARSHALL,
A. D. MCNAIR,
Committee.

4. REPORT OF THE COMMITTEE ON LEGISLATION.

Your committee on Legislation, composed of Lee Young, of Stephenville, chairman, John S. Kerr, of Sherman, secretary, and W. R. Spann, of Dallas, report to the Farmers' Congress as follows:

Remarkable success has attended efforts to secure the legislation demanded by the last session of this Congress. It has been such that we must disclaim any credit for much of it, and state the reasons therefor, and give credit to the many persons and organizations which have contributed to bring about the results stated herein. We are glad to do this, and feel, as did Admiral Schley at the battle of Santiago, that there is "glory enough for us all." We express our gratitude for the courteous treatment we everywhere received, and state that we have not been regarded or treated as "lobbyists," but as men who were faithfully serving their country. It is impracticable to name all who gave active support to our measures, but the services of some were so signal that it would be ungrateful not to recognize and give credit for them. But for this active support the results attained would have been impossible.

Among those whom we wish to specially accord credit are E. A. Calvin, President, and W. F. Davis, legislative agent, of the Farmers' Union; J. H. Connell, President of the Farmers' Congress, who was at all times active and influential and untiring; R. T. Milner, Commissioner of Agriculture; R. A. Bradford, President of the Sheep Breeders' Association; Chas. B. Metcalfe, Vice-President of the Southern Cotton Association; Judge V. W. Grubbs, of Greenville; E. R. Read, Master of the State Grange; R. B. Cousins, Superintendent of Public Instruction.

Prof. J. H. Connell, President of the Farmers' Congress, is ex officio a member of this committee, and he has been the life of the committee and the soul of its work. He has never wearied of laboring for the cause and his work has been done with force and spirit. It is more to his persistent effort than to any other cause that we are able to make this report. We sign this report without his concurrence because we wish to say this of him and his work.

We have also to thank Hon. O. T. Holt, of Houston, Chairman of the Platform Committee of the Democratic Convention at Dallas in 1906, who recognized the value of the demands of the farmers of Texas, and made an appointment on the subcommittee at our request, to the end that we should be fairly represented before the platform committee, and also Chas. H. Jenkins, of Brownwood, who became our representative on the subcommittee, and our spokesman before the committee. The standing, and character, and ability of these gentlemen is such as to give force to whatever they advocate. The people of Texas owe them grateful recognition.

In naming a few who gave active support, we do not wish to minimize the work of others, and fail to mention them only because to do so would take too great a portion of your time.

The work of your committee has been chiefly to allign the forces which would bring about the results desired, and to secure united effort on the part of the associations which constitute the Farmers' Congress, the Farmers' Union, the State Grange, the Southern Cotton Association, and all of those who favored the legislation proposed. In this we were successful, and to the harmonious work of all these influences we owe the results which we now report to you. It is not our work, but the work of all these organizations, united as never before in a common cause.

We give credit to the press of Texas for its efforts, and for the untiring work done by it. This has been without pecuniary reward. We have paid nothing in the way of printing bills for publicity, and every article we wished given publicity has been published by the press without cost to us. We give especial thanks to Farm and Ranch, which at its own expense, maintained a representative to the Legislature, primarily to secure passage of the bills prohibiting gambling in futures, and prohibiting gambling in Texas, but who rendered effective service for all the measures committed to our care. Hatton W. Sumners, of Dallas, the representative of Farm and Ranch to the Legislature, also deserves our thanks for his splendid work. He is intelligent, capable, untiring, and does not know the meaning of the word "defeat."

We had also the helpful work of the State Teachers' Association, and members of that association were outspoken and vigorous in support of the demand that agriculture be taught in the public schools. This assistance was given, though some of our committee declined to assist them in their demand that a Superintendent be provided in each county in which the scholastics numbered over 2000. Hon. R. B. Cousins, Superintendent of Public Instruction, attended our meetings, and himself supported our demands before the platform committee. We mention this because it shows the unselfish spirit in which the Superintendent and the association worked to sustain your demands.

In his opening speech for the Democratic nomination, Hon. T. M. Campbell had declared for an effective department of agriculture, and this was of great value before the convention. He also acted with our committee, and some of our bills were regarded as administration measures.

The work done is that of all the forces united. We recognize that our labors are but a small part of what was done. Others have done far more in your behalf than we were able to do. To them the credit is due.

It has been our policy to recognize the fact that the members of the Legislature, who had in hand the several bills in which we were interested, should have credit for their work, and for this reason we purposely, and after full discussion as to our best course, allowed the members to prepare their own bills, taking due care to see that they were such as to meet your demands. We refrained as far as was possible from thrusting ourselves into legislation, content that the results should be what you desired. We deemed this the wiser course.

In order to secure harmonious co-operation of all forces your committee. through its Secretary, Mr. John S. Kerr, issued a notice and request, that each of the several associations and organizations should appoint an auxiliary committee to work with the legislative committee; the committeemen to be in full sympathy with the policies of the Farmers' Congress, especially with regard to the establishment of a Department of Agriculture and the teaching of agriculture in the public schools. In this notice we also stated our purpose to have inserted in the next platform of the Democratic party a plank favoring these measures, and requesting that as many of the committeemen as practicable should attend the convention. Most of the associations made the appointments, and with this alignment of forces we went to work, to bring public sentiment to favor our measures and to secure favorable action at the convention.

It became then important to secure a proper chairman of the committee on platform, and a representative on the platform committee. In this we could work only as individuals, members of the party. It is proper to say that we did not ask any pledges or promises from those whose services we asked, and felt assured of fair and just treatment only from the well known character and high standing of those upon whom we relied. That this faith was justified the result shows.

By united effort we succeeded at Dallas in having the Democratic party declare in favor of most of the measures. It is a pleasure to report that the subcommittee of the platform committee reported to the committee the now celebrated "nineteenth plank" in the identical words we had requested, without any changes whatever, and that this "nineteenth plank" became, in due course, a part of the Democratic platform. When this had been done and an express and forceful declaration of purpose secured from the party, we felt that our work was progressing well, and that we were well on the road to the accomplishment of your commands.

The "nineteenth plank" marks a long step of our State in educational progress. It will be a landmark for all future legislation. It is now a part of the history of the Democratic party in Texas, and as declared by the Fort Worth Record, in an able editorial favoring its full enforcement, marks an era in our history. It is also destined to live in the history of this country as the result of united effort of the agricultural interests of Texas.

Its demands were given life and vigor by the fact that back of it stand the united forces of all the agricultural associations of Texas with more than a quarter of a million votes.

When this declaration had been secured we felt that the stress of our work was over, and that the result was assured, provided we should see that the fruit of the victory was not taken from us.

When we went before the Legislature the attention we received, the consideration shown to us, and the earnest desire of legislators to give effect to our demands, show that men who come before that body serving the public without compensation, and solely from a sense of patriotic duty, are not regarded with the suspicion which attached to the lobbyist, whose self-seeking is justly regarded with suspicion, and whose demands are either ignored or opposed without hesitation. We believe that proper legislation might more often be secured, if the demand for it should come from those who have no axes to grind, and no selfish purposes to subserve.

The legislation which you demanded was:

(a) The establishment of a Department of Agriculture. This has been done, and the department is now a living fact. In order to give the department a stronger hold and more extensive powers, a constitutional amendment will soon be submitted to the voters of Texas. That this will be carried is certain, and the department should be made the pride of all Texas.

(b) Your next demand was that agriculture should be taught in the public schools of Texas. The law now so requires. Your demands have been met.

(c) The next of your demands was that gambling in futures in Texas should be prohibited. All that you asked has been done. The gambler in futures is now classed with other criminals and disreputable characters, and driven from the State in disgrace. The signet of your condemnation has been set upon such as he, and he stands as a criminal with all his corrupt practices denounced by the law.

With regard to this, we state: Fortune favors those who strike at the proper time. Many influences tended to bring about the result.

At the crucial moment a gambler murdered, in cold blood, an able, efficient and determined officer for no other cause than honest effort to rid his county of criminals. Jeff D. McLean, county attorney of Tarrant county, became an offering of society upon the altar of patriotism. This shock to our State brought to those fighting for moral reforms those who hesitated, or who feared to offend the henchmen of the gambling fraternity. The name of Jeff D. McLean should be spoken with words of love in every home in Texas, and he should have a place in the hearts of a grateful people.

In Austin there was a strong lobby to defeat the measure to prevent gambling in futures. This lobby was bold to the point of impudence, unscrupulous in its methods, and without moral restraints. The amount spent to maintain the lobby must have been enormous, but the amount of money seemed equal to all demands. The criminals were fighting for both fortune and life. Their depredations and robberies are at an end.

(d) Another of your demands was a scalp bounty law. A bill covering this demand was passed but was vetoed by the Governor.

(e) Our efforts to secure adequate appropriations for the agricultural department of the A. and M. College were not so effective as we had hoped. The amount is $———, which is better than at other sessions. It is sufficient to prolong the life to the department of the college, which should be its chief interest. It is an anomaly that an agricultural college should be able to give so little effect to the agricultural department thereof. We suggest to you a consideration of this condition, and that steps be taken to give more effect to the best interest of the college. Earnest work is needed here.

(f) Our efforts to secure adequate support for the Department of Agriculture were fairly successful. An appropriation of $20,000 was recommended by the committees to whom the bill was referred, but it was subsequently reduced to $10,000 by the committee on appropriations. A larger sum is needed, but this is sufficient to place the department in working order, and to show what its value may be when our people shall awake to the necessities thereof.

An appropriation of $15,000 was made for the purchase of live stock for the A. and M. College. This will go far towards enabling the college to teach animal husbandry with such specimens of the best breeds as should be the case with the college. This was greatly needed, and was a concession to the actual needs of the college. We have worked diligently for the college, feeling that the agricultural interests of Texas would be best served by placing the institution upon the highest possible plane and that this is in fact our college in which we should never permit our interest to lapse for one moment.

We have continually been met with the suggestion that the cost of the things we asked would be too great.

To this we reply that the farmers of Texas are no longer willing to "take what is left," but propose to take what they want, and let others take what is left—that we propose to come first.

We have said nothing of the members of the Legislature who supported your measures, since this would take too much time. The records show all this.

and these records will be of value in the future. Both in the senate and house we had able and efficient support.

The bill to establish the Department of Agriculture was a substitute of the committee for the bill offered in the house by Mr. Nelson, of Kaufman, and in the senate by Mr. ———. The substitute was prepared by the committee, with the assistance of Hon. R. T. Milner, R. V. Davidson and Governor Campbell. Our several committees met in Austin on February 13, 1907, with many who were interested in the bill, and carefully examined and discussed every feature of the bill. While it fails in some measure to meet our views, yet we thought it best to support it, and we therefore went to work to secure its enactment. In this we had efficient assistance of both Mr. Calvin and Mr. Davis, of the Farmers' Union, and of Mr. Metcalfe, of the Southern Cotton Association.

A real Department of Agriculture has been the desire of this body for many years. At each session we have asked for its establishment, and each Legislature failed or refused to grant your wishes. When all the agricultural interests demanded, and would not be refused, you were given what you asked. The forces behind us were sufficient to show how much in earnest you have been for these past ten years. A quarter of a million votes command respect. They inspire confidence.

We believe Hon. R. T. Milner will make the department a live institution, effective for good, and not a mere bureau of statistics, which no one ever reads. The powers given to him are ample, and the result must rest with him. The possibilities are beyond calculation.

These are the results of work done by many who have served you well. Our own part has been so small that we gladly give the credit to the others who have served you. Permit us to congratulate you. The work done has demonstrated that the Farmers' Congress and allied organizations, and the Farmers' Union, are indeed powers in the land. Asking only what we felt ought to be granted, we have not been, as for ten years past, given a stone when we asked for bread.

One other thing we call to your attention. During all the years in which this Congress and the farmers of Texas have been demanding the establishment of a Department of Agriculture, you have had the steady and unrelenting opposition of a lot of politicians, who have denounced your demands and refused them, because they were impracticable, or because they would cost too much, or for other reasons. When your forces were organized, and your committees were permitted to write the "nineteenth plank" in the Democratic platform, and resistance was no longer popular, the number who came rapidly to your side was a multitude. These deserve small consideration at your hands.

And already there are some who wish to forget that you had a hand in forming the policy of this State, in regard to the things which affect you so vitally. Your numbers, your power and the fear of your influence, and of your votes, brought much assistance. This is a tribute to you, and at the same time it is a warning to you, to keep up your organizations, and not to grow weary of the great work you have undertaken.

Persistent work is the price of success.

THE BIRDS OF TEXAS.

M. B. DAVIS, Waco, Secretary Texas Audubon Society.

If one fixes attention on the destructive agencies in operation, which if continued unchecked and unretarded must inevitably lead, in the end, to the utter desolation of the planet we inhabit, the soul sinks low in despondency and the disposition to shed tears arises.

The wasting of forests in progress threatens to increase areas rendered uninhabitable, threatens to extend the desert regions everywhere, while the inveterate slaughter of wild dumb creatures brings the conclusion to all who observe it that mammals and bird life will utterly disappear. This will be a lonely and gloomy world should the time come when trees, birds and beasts shall be no more. The rate of dwindling of the forests alarms thaughtful people and under pressure of enlightened public opinion steps are being taken to arrest the destruction, greed and vandalism is accomplishing.

Lovers of bird life naturally figure on forests and the preservation of forests. Should the forests disappear wild life must practically cease to exist, for a treeless world would afford but a meager home for the birds of the air and the beasts of the field.

One of the experts of the government, R. S. Kellog, after looking over the field, stated that rapidly as the population of the United States increases consumption of lumber increases more rapidly. The lumber cut in 1880 was 18,000,000,000 feet; in 1890, 24,000,000,000 were cut and marketed, and in 1900 the 35,000.-000,000 mark was reached. Now the increase in population from 1880 to 1900 was 52 per cent, but in lumber cut in that period the increase was 94 per cent. The United States uses annually 400 board feet of lumber per capita, while the average in Europe is 60 feet per capita.

I do not want to dwell too long on these statistics, because I am here to talk about the birds, but who can talk about the birds and leave out the trees, and it is evident that according to the figures given, which come from the United States Department of Forestry, the time is coming, unless a halt is called, when the territory over which the Star Spangled Banner has dominion will be without trees. Fortunately steps are being taken to stop all this. The effort is strong, but not yet equal to the task. It is said that the annual increment of timber under protection and cultivation is ten cubic feet per acre, but the government thinks that this can be increased to thirty cubic feet per acre, and if such is the case the future will have trees left for the use of mankind, if protection shall be extended.

As to the destruction of wild life, I want to mention here before I forget it that the armadillos, once plentiful in Texas in the territory between the Colorado and the Rio Grande rivers, are already nearly extinct, because they have been hunted for their shells, which are used for parlor ornamentations, chiefly to make cases which are hung on parlor walls to contain illustrated postal cards and such other rubbish. The armadillo is not a bird at all, although a jocular correspondent mentioned him as a "warbler," but, like the birds, they lead useful, harmless lives, and put in most of their time dragging about a funny little stumpy tail and rooting in the forests and in the fields after ticks, crickets, beetles and the larvae and the eggs of those insects. The Texas armadillo has nine girdles and is found as far northwest as Jones county and as far northeast as Williamson county. They were particularly plentiful in the Guadalupe, San Antonio, Nueces and Rio Grande valleys. From that vast habitat, constituting more than one-fourth of the State of Texas, they have nearly disappeared, and will have wholly disappeared unless their slaughter is arrested within the next twelve months.

ALLIGATOR PASSING AWAY.

I have before me representatives from perhaps all of the districts of this mighty State, and among them are those who in former years had their slumbers disturbed in the lower Brazos, in the Yegua bottoms, in the Trinity low grounds, in all of the lower rivers, by the nocturnal bellowing of the alligator. I am not prepared to state that the alligator was a useful ally of the farmer as to insect extermination, nor will I undertake to show that his music was charming to the ear. It is certain that he ate up valuable dogs, pigs and calves and now and then turned his attention to boys bathing in the river. I do assert, however, that the hide of the alligator constituted a valuable product and that there is nothing in the world that will answer as a substitute for alligator leather. It is now like a buffalo robe—an impossible article, and the fortunate possessors of suit cases and purses of genuine alligator skin count them as treasures above price. In 1890 the alligator population of Texas, Louisiana and the other Gulf States combined was placed at 50,000,000. They have now become so scarce that it has been found profitable to raise them for the market, and that is being done in Louisiana, in Arkansas, and preparations are on foot to start an alligator farm in one of the lower Brazos river counties. An Englishman is running an alligator farm near Hot Springs, Ark., and hatches out his young 'gators with an incubator. I saw a picture in a newspaper the other day of a pair of alligators hitched to a baby wagon, in which a chubby little fellow, appearing to be about 3 years old, was smiling with delight as he drove his saurian team through the paved streets. I use an Angora kid for the same purpose, as far as my grandboy is concerned, but the account appearing with the picture stated that the domesticated alligator could be trusted with a baby. The alligator, the armadillo, the horned frog, all these things are disappearing; the horned frog, a splendid little bug-egg eater, having been placed on the list for destruction because their embalmed bodies are wanted as curios by the purposeless collectors.

Coleridge, in his poem entitled, "The Rhyme of the Ancient Mariner," describes the old sailor who, having slain the albatross, was doomed to wear the carcass of the bird hung around his neck. I would not enact any cruel law if I were a czar reigning over this country without a constitution with unlimited authority. That is, I do not think I would, but recently, while driving in a buckboard I saw men shooting upland plovers and leaving them on the prairie, where they fell, wantonly killing these beautiful birds with their stomachs distended with grasshoppers. Now, the old sailor, who, with his crossbow, slew the bird which the sailor men believed controlled the winds the ships needed to move them along their paths through the sea, committed no crime at all compared with the man who shoots down insectivorous birds while they are plying their avocation of protecting the crop of the farmer, and I would like to see one of those destroyers compelled to wear strings of dead plover around his neck until they attain what is called the "gamy flavor" the epicures admire—in other words, until they are a little rotten and therefore ready to be put on the bill of fare in the restaurants, where the gormands devour God's favorite creatures—the beautiful birds.

VALUE OF RAINCROW.

There is not a man nor a woman in this audience who has not heard the peculiar, metallic cry of the raincrow. Because of having the lower mandible entirely yellow, the raincrow is called the yellow-billed cuckoo. I don't intend to give his scientific name, because it would take too long and I am afraid I might miss it, even if I should try. The raincrow is a beautiful bird of white and brownish gray plumage, and flies noiselessly through foliage, however dense, in his ceaseless war upon the caterpillars. There are colonies of caterpillars which devastate the fruit trees, which build themselves tents, and I do not know of any other bird which has the power to tear a hole in that tent and drag out the caterpillar. The raincrow does it, and does it with ease, and if you should obtain the carcass of a dead one, which I hope you will never do, you will find that the inside of his craw is lined with the fuzz from caterpillars. They begin early in life, and put in their entire existence in the extermination of caterpillars. Particularly ignorant people are superstitious about raincrows, and all of the semi-savage inhabiting our country regard them as a dietary article and shoot them. As in the case with the shore bird, the red bird, the jay bird and the oriole, the raincrow is hunted for his hide, which the ladies admire for the ornamentation of their headgear, because of the glossy iridescence of the plumage and the unspeakably superb blending of the white beneath and the soft brownish gray of the upper parts of the body. The ladies are largely responsible for the disappearance of the birds of beautiful plumage, and in the end, unless a halt is called, there will be no such birds in the world.

I was put on this program to talk about the birds of Texas. If I were to tell you what I have found out about the birds of Texas, I would be talking here for a month, and yet the facts which have come into my possession through personal observation are less than one-half of 1 per cent in comparison with the knowledge obtained by such men as Dr. C. Hart Marriam, chief of the Bureau of Biological Survey, Dr. T. S. Palmer and other experts employed by him in bird study, and in comparison with the knowledge obtained by Hon. William Dutcher, the President of the National Association of Audubon Societies. I shall therefore discuss only a few of the Texas birds, and I will confine myself to those which experience has taught me to believe are the most useful in this State. There is no question in the world in my mind but that the swallows and the bullbats take rank above all others as being absolutely without any proclivity toward mischief, and entirely useful throughout their lives. These birds feed on the wing, and they catch gnats and weevils in multitudes. The bullbat, called also the night hawk, has a mouth big enough to swallow himself, and he sweeps up and down the cotton rows as soon as the sun begins to dip down the western sky, catching boll weevil by the dozen. He asks for a few sticks and trash in some lonely place for his eggs, and as soon as the little one can fly he is up and out, keen and alert, constituting a muscular appetite, with nothing else except feathers and wings. Graceful of flight, alert, born hungry and never satisfied, he wants nothing in the world except pernicious insects, and is doomed to cover vast areas on his tireless and graceful pinions, to satisfy his cravings.

BLACKBIRDS EAT WEEVIL.

Last winter I became associated with Arthur H. Howell, one of the field observers of the Bureau of Biological Survey, and I watched him work. He was engaged in taking blackbirds and embalming their stomachs, as he called them. When he spoke of the stomach, he meant that part of the bird's anatomy which we call the gizzard, and, as some birds have no gizzards, in such cases he obtained another dilation of the aesophagus, called the proventriculus. Mr. Howell found that the blackbirds, which are outlawed in Texas, were boll weevil destroyers, and were highly useful in protecting the farmer from insect pests. In a recent bulletin from another expert in the Biological Survey, W. H. Henshaw, I find corroboration of my observation that the swallows which include the martin, are superb destroyers of pernicious insects. The cliff swallow, or mud dauber, which is probably a Western bird, is one of the most useful of the tribe, but they are growing scarcer every year because they have been crowded out by the European sparrows, and they have been ruthlessly destroyed because they have learned to construct their mud houses under the eaves of barns and other buildings and were believed to breed bedbugs. The parasite which is found in the habitation of the mud swallow has no relation whatever to the bedbug, and is absolutely harmless as far as human beings are concerned. They live and die in the swallow's nest and never crawl, but the belief that they are bedbugs is responsible for a large portion of the destruction of the swallows.

I hold and believe, and think I could prove, that every bird that flies at some time in its life eats insects. The turkey buzzard devours the maggot fly in the carcasses, and the eagles and the hawks find a time in their lives when they prefer grasshoppers to any other diet. Any one who has been through a grasshopper plague and made close observation has seen the hawk flying down devouring those acrobatic bugs, whose migrations are attended with fearful devastations. But the cheap shotgun and the vandals hunting to supply the restaurants and the millinery trade have doomed bird life to destruction, and those who are unaware of the agencies at work to arrest the slaughter are almost in despair.

In the United States the most powerful agent toward protection is the Bureau of Biological Survey. It has mapped out the life zones of the plants, birds and mammals and is ascertaining all the correlations. By every agency it can bring to bear it is seeking to arrest slaughter and is succeeding, and the Department of Forestry likewise is struggling against the ax and the sawmill to prevent the total destruction of the forest, which has already reached such an extent that devastating floods are occurring annually to an extent never before realized. The forests are related to the water supply—take away the forest and the fresh water will go, too, and when there is no fresh water in the course of time there will cease to be salt water, and when there are neither trees, fresh water nor salt water earth will revolve in its orbit, a planet without life. Such a condition will never be reached, because the people are aroused and they intend to bring those things to an end.

WORK OF BIOLOGICAL SURVEY.

The Biological Survey has done a great deal toward protecting native birds and animals; it has also prevented the importation of harmful birds and animals, and it is importing such laudable species as the Scandinavian ptarmigan and the capercailzie. The capercailzie is an enormous Scotch grouse. The male is as large as a fat turkey hen and carcasses have been known to weigh ten pounds when dressed. They breed easily in preserves, multiply exceedingly fast and may take the place of our pinnated grouse, which exists largely now in the imagination of men who go out shooting and write accounts of their success in the newspapers. My old comrade and friend Atwater will tell you that the Texas grouse, once existing in boundless abundance on Texas prairies, can only be found now in a few limited areas.

Ladies and gentlemen, I know you are getting tired hearing me, but I can't help that. I have more to say, and I won't let go until I tell you about the martin, which belongs to the swallow tribe, which you can increase in numbers by putting up boards and boxes for them to build on. I would like to talk about the orioles, the mocking birds, the mourning doves, the meadow larks, the robin, the flicker and a dozen other varieties, but I haven't the time and I am satisfied that I would wear your patience out. I ask that this Congress shall give its earnest support to the Bureau of Biological Survey, the Audubon Societies and all kindred organizations and join with those who are seeking to stay the ruthless march of destruction, which if allowed to move unchecked will work out such evil as no mind can fully grasp.

THIRD DAY—AFTERNOON SESSION.

OBJECT LESSONS IN BUTCHERING, CURING MEATS, DAIRYING AND BEE-KEEPING.

Hogs.

Mr. F. R. Marshall, Professor of Animal Husbandry, A. and M. College, had charge of the live stock and meat curing demonstration. The stage was fitted up with a pen containing several hogs. He pointed out the lard type, represented by a six months' old Poland China, and the bacon type, represented by a Yorkshire. Mr. J. J. Ferguson, live stock expert for Swift & Co., of Chicago, used these hogs and a number of large charts, hung where the audience could see them, to bring out clearly the points of value in the improved breeds of hogs demanded by the markets of this country at the present time. The bacon type hog is the hog demanded by the packing house people, and its ideal weight is from 175 to 200 pounds.

Meat Curing.

Meat curing methods were demonstrated by H. E. Singleton, of McKinney, and a general discussion of cutting and curing meats on the farm followed.

Dairying.

Mr. C. H. Alvord, Professor of Agriculture, A. and M. College, had charge of the dairy demonstration. Modern dairy methods and dairy machinery were demonstrated; improved churns, milk testing machines, and separators were placed before the audience, and a test of a milking machine was made at the veterinary building.

Bee Keeping.

Mr. Udo Toepperwein was in charge of the bee keepers' demonstration. A hive of bees was used in this demonstration, and honey was taken from the hive before the audience while bees buzzed about, but neither the operators (who worked without gloves or veils) nor the onlookers were stung. So much for improved methods of handling bees.

OUR NEW STATE DEPARTMENT OF AGRICULTURE.

Commissioner of Agriculture, R. T. Milner, delivered a brief address during the final session of the Congress on "Our New State Department of Agriculture." He was introduced as the first real commissioner of agriculture Texas has ever had.

He reviewed the history of the Bureau of Agriculture, created in 1887 and attached to the Department of Insurance, Statistics, and History; described its work, as reflected in the annual reports of the bureau; touched upon the enormous cost of these annual reports—over $100,000 for the first one, and from $22,000 to $25,000 for subsequent ones—and of their small practical value to the practical farmers, they being of use to the homeseeker chiefly.

He gave an account of the careful preparation of the bill creating the present Department of Agriculture, and outlined the work the department proposes to do, work that is eminently practical. He referred to the publication of the proceedings of the Farmers' Congress and expressed the opinion that it was most fit for the department to do this work and in this manner bring in contact the progressive farmers of this Congress with those who never attend.

He requested the co-operation of the members of the Farmers' Congress in doing the work mapped out for the department, and particularly in organizing farmers' institutes and in pushing other efforts to reach the less progressive farming elements for the purpose of stimulating new thought, new effort, and better methods in farm practice.

Before closing the work of the Texas Farmers' Congress for the year 1907, President Connell called on Uncle Dick Bonner for some remarks appropriate to the occasion. He responded with "The Farmer."

THE FARMER.

D. H. L. BONNER, Omen.

I desire to thank the people for the interest that has been manifested here in this great work that lies before us. Sitting here a while ago, hearing these men talk about the Farmers' Congress and about farmers, the thought came into my mind, "It is a wonderful people that we call the farmer."

Now then, the farmer stands at the very foundation of all the education, all the learning, all of the science, all of the religion, all of the architecture, and all of the commerce of this world. Had you thought about the importance of that fellow called the farmer? Who made it possible for you to build this magnificent structure here? The farmer. Who made it possible to build the cities that decorate our State? The farmer. Who was it led the way and brought people that made it possible that Texas should be the greatest place on earth? The farmer. He is the first person who goes into the business relations between man and man. Sometimes he has to go down on his knees to his own creation to ask his rights. I want to say this much more. I am a farmer, and am glad of it. I want to tell you that in the Agricultural and Mechanical College we have something to be proud of.

There is not a lawyer who pleads at the bar of justice, there is not an official at the head of the executive government who is prouder of his profession than I am of mine, and I am a farmer. I live with the fruits and flowers and trees, and I live with nature. We ought to all live like the farmer, because it is the source of all we enjoy. The farmer feeds the world. We have the biggest job on our hands of any people in the world. We feed the kings, princesses and emperors of the world, and even our own magnificent Teddy eats what we raise on our farms.

Who is this farmer? What is his interest? All other interests, all other avocations among all men ought to bow down to the interest of the man at the plow, because if it were not for him the world would starve helplessly as the infant would apart from its mother. Who is this farmer? We talk about this Farmers' Congress. I have heard men say they felt honored because they belonged to this Farmers' Congress. Wherein does this honor reside? It ought to reside in the breasts of the men who ought to know what honor is, and in this case it must reside with the farmer.

We ought to know the importance of the farmer, and it is there that I list the hope of this country of ours. Look yonder (pointing to several children). You see there the coming men, in those little boys, and the coming women in those little girls. It is into their hands that we are to give this country of ours. I have heard men talk about collecting money to have men teach these children agriculture, and I felt sorry for the poor fellows who wanted some men to come around and lecture about these things, and tell them things away above their heads, and that they could not comprehend or understand. How easy it would be to teach as they are teaching in Louisiana. How easy it would be to teach that little boy and get him interested, and to get him to experiment in the germination of seed. Now, I believe that every teacher should be required by law to take these little fellows out and have a garden attached to the school yard, and take seeds, give the children some seeds, and plant them; require that each child should take up a seed the first day and compare it with a seed he had kept out of the ground. Take one on the second, and third and fourth and fifth days, until he learns the gradual growth into the actual flower or shrub, and you will get the interest of the little child excited, and he will follow out these teachings all the days of his life.

I want to tell you there is more science in the growing of a stalk of corn than there is in some of your very highfaluting demonstrations that you have in your chemistry. There is more science in knowing the when, the how, and the where of the growing of all the plants than there is in the thousand theories advanced, no matter whom they are preached by, and it is the practical life that we want taught in our schools and by our teachers. We want to teach them that this subject is no child's play, that it is their duty. We want them to know that we want them to elevate that calling and put it high above all other avocations among men, because it is above all others. It takes more hard study to make a farmer than it does to make a lawyer. It takes more intelligence than it does to make a school teacher, or man of any other profession that we have. In fact, God made the farmers, and the others are just parasites.

Teach the boy to be a farmer; teach him to love the farm home. Just here I am going to drop another suggestion. Take some young lady who is well posted on domestic economy and put her to work with your lecturers in your institute work. In Louisiana last year two young ladies were sent with me from the Industrial School there, and they taught the ladies on the farms. They talked on household economy. They talked on the hygiene of the home; they talked about the building of the home. They were grand young ladies, and they are raising the standard of home life on the farm in Louisiana.

When you conduct your institute, take the ladies with you. Why don't you get the farmer's wife to come to these meetings? Get her to come and listen to these women, and learn to get the best out of life. Learn how to teach that bright-eyed little girl to know the love and peace and satisfaction of life on the farm.

President Connell: It is right and proper that the Farmers' Congress should close with an oration dealing with the farmer, and the farm home. We are glad to have heard Mr. Bonner on this subject. There is none grander to be considered in our country.

EXHIBITS.

Houston Daily Post.

The exhibits of farm products are very creditable, there being an especially good showing of fruits that indicates the possibilities offered fruit growers in Texas. The center of attraction in the horticultural division is a fine exhibit of fruit and vegetables from Denison, Grayson county, where great progress has been reported along agricultural lines during the past year. This exhibit includes some very fine peaches from the Denison peach show held last week; also a great collection of grapes, cabbage, onions, potatoes, and other products which are being grown at Denison with great success this season. The collection is exhibited by the Denison Board of Trade.

The machinery exhibits and the demonstrations attract large crowds, indicating that the interest aroused in advanced agricultural methods is serving also to interest the people in improved machinery.

Brownsville Bananas.—One of the heaviest bunches of bananas ever raised in Texas is on exhibition at the Farmers' Congress. The bunch was raised on the South Texas Garden, recently established by the United States government. Sergeant Chris Miller, a retired soldier, who is in charge of the Fort Brown reservation for the War Department, grew the bananas on the reservation without fertilizer or irrigation. There are fifty-five large fine bananas on the bunch.

Milking Machine.—The demonstrations of the milking machine at the Farmers' Congress have attracted large numbers each evening to the veterinary building, where the exhibition was given. Professor Alvord stated that "from the numerous attempts to construct a mechanical cow milker there has at last been evolved a machine which is practical. This machine, so simple that it would seem that almost any one could have devised it in a day, is the result of fifty years' work by inventors of America, Great Britain, and Australia.

At the Congress it was possible only to show that cows can be milked by machinery. This is the first public demonstration in the State, with cows from the College herd milked in this way for the first time. The cows made no objection to the operation, not even the old dun cow, whom the stable hands introduced as a "kicker."

For the result of continued use of the machine, reference may be made to the experience of H. B. Gurler, of Chicago, and other dairymen in the North; to the Kansas Experiment Station Bulletin No. 140; to the Department of Agriculture at Washington Bulletin, "The Milking Machine as a Factor in Dairying," and in Texas to Alexander Sinclair, of San Antonio, who has used the machine for a year and a half, and who conducted the demonstration at the Farmers' Congress. The A. and M. College has purchased an outfit.

Mushrooms.—Udo Toepperwein, of San Antonio, distributed some interesting literature on how to grow mushrooms. He also has an exhibit of mushroom spawn.

Honey.—The bee keepers' exhibited honey packed for market, and a number of honey products, bees, bee keepers' supplies, etc., were displayed.

II. TEXAS NURSERYMEN'S ASSOCIATION.

THE FRUIT FAILURE OF TEXAS ORCHARDS IN 1907.

JNO. F. SNEED, Tyler.

There is a good deal of mystery connected with the fruit failure and considerable difference of opinion as to its cause. My views in regard to the failure are in keeping with some others I have heard. The peach as well as some other stone fruits are mostly adapted to the temperate zone and require a rest during the winter. The fact of our having torrid zone weather during the past winter and the trees having a continuous flow of sap nearly all winter, with dry weather, weakened their vitality and caused the blooms as well as other buds to become very weak; consequently they were not able to survive the severe test; hence the failure in fruit and the death of many old orchards in some of the finest fruit sections of Texas. My critical observation failed to detect any difference in the bearing of the cultivated and the noncultivated orchards except that the cultivated orchards seem to have more vitality and to have been better able to overcome the severe ordeal. I observed that the finest orchard locations, the high well drained lands, made the most signal failures. I noticed a few small orchards which were planted under the hills in moist land that had very good crops of fruit on them. This goes to prove that the cool weather which settled under the hills had given them a rest and that the moist earth had given them sufficient vitality to hold the fruit. However, we do not consider these low lands suitable for profitable peach orchards on account of late frosts. In Northeast, North and portions of Northwest Texas, where they had colder weather and more rain, they had considerable fruit.

THE REMEDY.

The remedy lies in the free use of the pruning shears in cutting back severely for the purpose of promoting vigorous new growth, in shallow cultivation, in keeping the land level, not banking up the land around the trees and in planting either in cotton or cultivating clean till July or August, then planting in cow peas or peanuts in rows so as to cultivate one or more times after they are planted. Also a good coat of fertilizer should be used around the trees. Persons who have looked after their orchards that were not too badly damaged by pruning and shallow clean cultivation will have a fine growth this season, with a good prospect for fruit in 1908. Others who have failed to prune or cultivate their trees, which were in similar condition, now have orchards that are very dilapidated and look most unpromising. My opinion is that the persons who plant and properly care for their orchards at this time will be abundantly rewarded for their labors, and that the man who plants stone fruits and turns his orchard over to noncultivation can not hope to realize very much from his investment.

THE GROWING DEMAND FOR ORNAMENTALS.

J. B. BAKER, Fort Worth.

Twenty years ago the nurseryman in Texas was almost exclusively a grower of fruit trees. A few shade trees, arbor-vitaes, annual roses, and honeysuckles comprised the bulk of the ornamentals. Of late years there has been an enormous increase in the production of fruit trees for commercial orchards, but there has been a still greater increase in the production of ornamentals. In our own nurseries for instance, the ratio of fruit trees to ornamentals has so changed of late years that we now grow more sycamores than we do peaches, more elms than apples, more chinas than plums, more shrubs than grapes, and more roses than blackberries. Not only is the increase in the number of ornamentals used, but more particularly in the class, grade, and size of specimens. Formerly a sycamore was only a sycamore and sold for 25 or 50 cents, or a magnolia was merely a magnolia and sold for 50 cents or $1, according to the customer rather than the size or shape or vigor of the tree. Then an improvement was made when we began to sell trees according to their height, a four-foot, eight-foot, or twelve-foot for instance. This classification works very well as long as the increase in the diameter of the trees is in proportion to the increase in the height of the tree; but when the height of the tree is increased and the caliper is not increased, then the taller the tree the less valuable it becomes. We will use the sycamore again for illustration, but what is said of the sycamore will apply with more or less force to all other trees. A sycamore tree six feet tall and one inch in diameter is well proportioned; one ten feet tall and only one inch in diameter is of less value than the six foot tree; while one fourteen feet tall and only one inch in diameter is worthless. Now, after a tree gets to be ten or twelve feet high it is graded as being one and one-half inches, two inches, three inches, or four inches in diameter, and these are sold at one, two, three, six or ten dollars apiece, according to the size and shape of the tree. Such prices as these were unheard of twenty years ago. And yet the supply of these large trees never equals the demand.

The same thing might said of magnolias, *Cedrus deodora*, and a few of the rarer evergreens, while on the other hand, arbor-vitaes, retinosphoras, cedars, etc., are going out of favor. Hardy flowering shrubs are coming greatly into favor, especially during the last two years. We sell ten shrubs now to where we sold one three years ago. The monthly or everblooming roses have never lost their popularity, nor are they likely to do so, as they are so well suited to the soil and climate of Texas. They are hardy—that is, they do not need protection in winter—they are fragrant, are continuous bloomers, and, in fact, have everything to recommend them.

But the class of ornamentals that seem just now to be coming into favor most rapidly are the hardy perennials and herbaceous plants. Not all the perennials of the Northern gardens will flourish equally as well in the South, but many of the best grow astonishingly well here, and others can be grown easily when their requirements are better understood. The length of this article will not allow going into details, so I can only give the names of some of the flowers of this class that should be grown: hardy perennial phlox, dahlias, peonies, amaryllis (several kinds), German iris, Japanese iris, Mexican tuberoses, tritonia, golden glow, Shasta daisies, coreopsis, lathyrus, hardy pinks, violets, etc.

SOME NATIVE ORNAMENTAL PLANTS.

F. T. RAMSEY, Austin.

It took Texas nurserymen from ten to twenty years to discover that there were in Texas seedling peaches, plums and other fruits of much more value than some varieties of outside origin that we were selling. It took us twenty to thirty years to discover dewberries, and a lot of crosses between dewberries and blackberries. Some of these are now our surest, or I might say, our only unfailing fruits. I blush to think how we ignored them for so many years, but am proud that Texas was first to see their general value.

Why did we not go at grafting from fine pecans thirty years ago?

Some of us have grown baldheaded in the business, and are just now beginning to give correct advice to our customers about shade trees. Formerly we named a lot of trees, none of which were native. Now, the first thing we think of is a long limbed, big leaved elm, or a cottonwood, or sycamore, or hackberry, or ash, or walnut, or pecan, or wild china (*Sapindus*), or wild cherry, or Spanish oak, or liveoak. On most locations the greater part of these are luxuriant and always healthful, and no one knows how long they will live. If all the shades that have been planted had been of our native trees, what different aspects Texas homes would present.

We are fast learning the value of our native evergreens, and of our flowering trees and shrubs, and our bulbs and annual and perennial flowers. The woods and prairies are full of them.

How easy it is for one to become intensely interested in watching the more robust growth when they are cultivated. Many of them are perpetual bloomers under cultivation, and are so rollickingly grateful for a little attention that one hardly recognizes the shaded, drought stunted little plant that was brought from the woods.

In the southern and eastern part of the State everyone should have a magnolia (*grandiflora*).

Over this range and extending into the mountains you should plant some of the Texas mountain laurel (*Sophora secundiflora*), a bright leaved evergreen that in early spring hangs full of fragrant spikes of blue flowers that resemble wistaria blossoms. It grows from six to twelve feet high near Austin, and reaches thirty feet on the southwest gulf coast.

For large stately evergreens, plant our mountain cedar, and our southern red cedar. Give them room. You can shear them if you wish, but I do not like sheared trees. If the top gets broken, stake up a side branch and make a leader of it. Let us not forget that the Rosedale arbor vitae is a native of Texas, and nothing is more beautiful.

The *Leucophyllum texanum*, with its ashen colored foliage, loves attention. It is literally covered with mauve colored flowers at different times during the year coming into bloom in three or four days after a rain. It grows from Austin to Rockport. It and the algerita, or native barberry, are perhaps our best plants for yard hedges.

The flowering willows, of three or four colors, native from near El Paso, and introduced by Mr. Onderdonk years ago, show up best in extremely dry, hot weather. For a neglected or unfavorable location take it.

The *Pavonia lasiopetala* makes one happy every time he sees it. Blooms all summer, rosy pink, single flowers. A spreading shrub two to three feet in height under cultivation. The top dies off every winter. The seed grow easily.

Right at the top of my list of favorites is *Malvaviscus Drummondii*, a mass of fresh green foliage mounded up two and a half feet with a sprinkling of scarlet red flowers. It always draws attention. The frost takes off the top, but the root seems everlasting. One admirable quality about these and *Pavonias*, and in fact nearly all the shrubs from the arid or semi-arid sections, is they can be transplanted at any time with perfect safety if the tops are cut back severely.

Eupatoriums hang to a crack or seam in the rocks and cliffs of the Colorado and streams to the west, and there is so little moisture that the top never freezes off as it does under cultivation. In either location, in October and November, it is a mass of flowers, resembling *ageratums*, and nothing is more delightfully fragrant. Bees and butterflies cover it.

On certain dry hard ridges in the northern part of Austin a yellow and red lantana grows freely, but when cultivated the frost kills it.

One of the annuals, or biennials, that will be a favorite with all lovers of flowers near and far is *Gilia coronopifolia*, most generally called standing cypress on account of resembling in foliage and flower the cypress vine; also called captain's plume. Scatter the seed around your yard and you may have them for the balance of your life. When Bailey wrote about cultivation alone developing latent or new forms I did not fully believe it. In their wild state they rarely or never bloom the first year. Cultivation gets them muddled on dates, and they bloom from May until frost. We have found a snow white variety. They keep in water for ten days, and like a tuberose may be cut when the first flowers open and shipped long distances. The plants bear transplanting perfectly.

Salvia farinaacae, the blue salvia, is beautiful and easy to handle.

The firms up North handle seed and plants of our maroon and yellow *gillardia*, and we have them wild.

A good look at a patch of our blue bonnets will make a bad man good.

Texas is rich in cacti of many kinds. My father, during the war burned off the thorns and fed his oxen on our natives. Now we are entering a thornless age. I see Mr. Burbank asks $10,000 for his best new production. Texas has a good start of the one brought over to Corpus Christi from Mexico by the old

Aztec Indian long ago. The family cow of the near future will demand a thornless half acre for something green in mid-winter and in mid-summer.

There are no finer climbers than our red and blue clematis (*Coccinea* and *Crispa*), and we have woodbine and wild smilax, and trumpet creepers, both yellow and red, and we have mustang grapes that make everlasting arbors, and they are everlasting good ones, too.

Texas has more than her share of bulbs. The rain lilies, or fairy lilies (*Cooperia pedunculata*) spring into bloom in three days after spring rains, as also their close kin the yellow *Zepharanthus*.

The *Crinums* of the south, central and eastern timbered sections are as fine as any lily under the sun. Let them be planted everywhere.

I have mentioned but a few of the good native plants. The State is full of them. I wish the people would pay more attention to them; plant them; get acquainted with them.

It is easier to find beautiful native shrubs, vines and flowers, than it is to get rid of the belief that everything native is ordinary.

I believe I can get wild shrubs, etc., in a hundred miles of Austin that will command more admiration, and give more lasting satisfaction if properly arranged around a lawn, than all the shrubs combined that are now in general use.

On holidays and vacations, city families and families on the farms ought to go out on the streams, or among the mountains, and collect plants and shrubs. Cut off tops as soon as they are dug and roll in a damp towsack. You soon make pleasant acquaintances among the plants, and you wonder you did not know them sooner.

SOME NATIVE TEXAS TREES.

J. S. KERR, Sherman.

The man or woman who has lived on our vast prairies where the collections of annual flowers are large and the timber is, by reason of the topographical and climatic conditions, scarce and scrubby, and has thereby learned to look upon the native trees of Texas as insignificant and poor, needs to take a broader view. Texas really has a great wealth of native trees, but I can only refer to a few of our long and superb list of Southwestern trees. Botanical names added, are serviceable only to designate varieties more accurately than the common name does.

THE PINES.

We instinctively revert to these as the source of our timber requirements in East Texas. There are a number of varieties. They are what are termed coniferous evergreens, are beautiful in their majestic habit and their evergreen spine—like leaves, yet we are accustomed to look upon them for the wealth of the fine building material contained in their long straight bodies. For a long time we have enjoyed the cheapness of native pine lumber, which is second to none in value for ordinary uses, but now, since the supply is becoming short, our native lumber is taking the high rank of prices enjoyed by lumber of the North and East, and our lumber owners are enjoying a gold mine.

Pinus palustris, or long leafed pine of Southeast Texas, is perhaps our finest pine.

Pinus ponderosa, the yellow or bull pine, also of East Texas, is scarcely second to the above.

Pinus taeda, loblolly or old field pine, has little value as a timber tree, but is very common in many parts of East Texas.

Who does not love the piney woods, the grandeur and fellowship of her stately monarchs, the pure vivifying fragrance, the soft moaning music of her soft leafy boughs. There is a tinge of sadness when we open our eyes to the fact that our pine friends are passing, swiftly succumbing to the voracious lumber mill, and soon will be no more. Then, what?

For ornamental purposes, the above are not suited. *P. sylvestris*, Scotch pine, *P. Austriaca*, *P. Strobus* and *P. montana*, which may be found in nursery catalogues, are suitable for ornamental planting in Texas.

OAKS.

The oaks are among our important stalwart trees. They are deciduous (dropping their leaves in winter). We mention them as perhaps second in importance as timber trees. Quarter sawed oak lumber is a fashionable and very valuable material for fine building and furniture manufacture. Eighty dollars per thousand is a ruling price. Besides there are no more beautiful trees than our native oaks. They are of noble majestic habit, their varied leaves are all elegant. They are native to all our timber sections and will thrive even on our prairies if planted there.

White Oak (*Quercus alba*) is one of our finest timber trees; quarter sawed, it is the most valuable. Thrives in our bottom lands, principally in the eastern third of Texas.

Over-cup Oak (*Q. lyrata*) grows in the lowlands or swamps, attains 100 feet, is a fine timber tree.

Post-oak (*Q. stellata*).—The oak of the sandy uplands grows 40 to 100 feet, beautiful and round topped, but is scrubby on poor soils; a good timber tree. None of the above bear transplanting well.

Texas Red Oak (*Q. Texana or Cóccinea*.—A noble tree. Is a fine timber and a very successful tree for shade and ornament. Its pyramidal form and its dark green foliage changing to brilliant red in fall make it very conspicuous. It transplants well. Look for it in the beds and at the head of breaks and ravines, as well as in the more favored locations.

Live Oak (*Q. semper virens*) attains 50 to 70 feet and often of greater spread than height. A magnificent evergreen oak, growing profusely in South Texas, and will succeed as far north as Memphis, Tennessee. Nursery grown trees transplant well.

Pin Oak and Willow Oak grow abundantly in East Texas, are valuable timber trees and transplanted make the finest street and park trees. Besides, there are burr or mossy cup, red, scarlet, black, Spanish, water, black-jack, chinkapin, chestnut, and other oaks native to Texas, and all more or less valuable for timber and for ornament.

THE HICKORY.

There are ten or more families of the hickory in the United States. Of these, we know of at least four: The little Shellbark (*H. ovaya*) and large Shellbark (*H. laciniosa*) are highly valued for their nuts which are much esteemed for eating; also, for the timber of the tree.

Pignut (*H. Glabra*).—A valuable stately timber tree, and valued for park planting, but the fruit is not considered edible.

The Pecan (*Hicoria pecan*).—The pecan is the most important, by far, of the hickory family. They grow abundantly in most parts of Texas, and throughout the Mississippi valley and its tributaries—from Texas to Iowa and from Florida to Ohio. Improving and growing pecans for the market has within the past decade, received widespread attention. Texas, Louisiana, Mississippi, Georgia, Florida and North and South Carolina are leading off in this new enterprise. Texas producing more nuts than all the rest. Train loads of pecans are annually going out from Texas, and strong manufactories are hulling the nuts by machinery and selling the kernels of even our smallest nuts at 50 to 60 cents a pound, and making the finest confections and other important articles of diet. There is an enormous future for nut culture in Texas and the South. Get in line by taking care of the natural growth and plant pecan nuts and trees here and there. Nuts may be planted two or three in a place in January, where they are to stand, pulling out the weaker and leaving your choice at two years old. They are slow growers, so said, but you will be surprised how quickly they will tower up above and bless you. An immense nut planted in the corner of our yard but yesterday, it seems, now stands ten feet high and six feet spread, an important member of the family. Better still, plant an improved grafted tree and make sure of getting just the nut you are looking for.

OTHER NATIVE TREES.

Bois D'Arc or Osage Orange (*Toxylon*).—The dense orange colored wood of the bois d'arc is familiar perhaps, to every Texan, and all seem satisfied with the adage that it "will last a hundred years and turn to iron." The uses of the wood are many and varied. It takes a fine cabinet finish, is the best wagon wheel material and furnishes foundation for more houses and fences than any other material in Texas. The fine, big apples produced are eaten by range stock. If the hungry traveler be allured by their fine appearance to partake, he will declare them "apples of Sodom in pictures of gold." The trees are indigenous to the Southwest, from Kansas to Texas, attaining large proportions in our bottoms. A farm has no more profitable asset than a five-acre tract planted to bois d'arc for timber and posts. Plant 8 feet by 4 feet, and cultivate three or four acres. At eight years and ever thereafter, it will prove increasingly profitable. Also, one of our best shade trees. The wire fence has superseded the osage as a hedge fence.

Elm (*Ulmus*).—The elm trees of Texas are many, varied, valuable and handsome. The American white elm (*U. Americana*), is a magnificent tree, foliage broad green, habit tall, spreading, limbs gracefully upward, new growth frequently pendant, a universal favorite. We can not enter into details. The red elm, common or cork elm, slippery elm, wahoo or winged elm, rock elm, cedar elm, all these and other elms are among our native trees valuable for timber and for ornamental planting. Every loyal heart loves our elm trees. They transplant readily, and are most serviceable park and street trees.

The Ash (*Fraxinus Americana*) is one of our best native trees for timber and for ornament.

Boxelder (*Acer megundo*) is a member of the maple family, not so important as the other trees mentioned above. There are other native maples in East Texas.

Cottonwood (*Populus deltiodes*) is one of the most important of the native poplars.

The Dogwoods are valued for the ornamental effect of their peculiarly beautiful flowers and general habits of growth.

American Hackberry (*Celtis occidentalis*) is a good timber tree, very abundant. In recent years is becoming most popular as a street and shade tree.

Sycamore (*Plane tree*).—Our native sycamore is a most important street and park tree succeeding well under adverse conditions. The Oriental sycamore holds its leaves better than our native.

The Texas Umbrella (*Melia umbraculiformis*), believed to have originated in Texas near the San Jacinto battle ground, is a most beautiful ornamental tree.

Sweet Gum (*Liquidambar*).—Spontaneous in the lowlands of East Texas, an important timber tree, and handsome as a street or park tree.

Walnut (*Juglans nigra*).—Our native black walnut, second only in importance as a timber, nut and shade tree to our pecan. It is painful to note the shameful and reckless squandering of the fine heritage we have had in our native walnuts, by selling them for a song to English manufacturers, who see fortunes in them after paying the enormous export charges. Let us not only take care of these we have, but plant nuts and raise walnut groves, which will soon become valuable.

This list is becoming long, but we can not refrain from mentioning Magnolia grandiflora of East and South Texas, the finest of all the broad leafed evergreens.

The Cape Jasmine (*Gardenia*) with its glossy leaf and its immaculate white flowers fills the air around with sweet odors.

The Great Cypress of our swamps is largely responsible for the shingles covering our Texas homes.

There are many other native trees, to enumerate all of which would weary our patience. There are hundreds of trees little noticed which, with a habit of observation, will meet you at every turn and unfold to you the secrets of their life work in purifying the air by the action of their leaves, in decorating nature with their varied flowers, and in blessing the animal and the vegetable kingdoms, and fulfilling the instincts of their own natures, in their fruitage.

Let us cultivate more the art of knowing and appreciating our trees, opening our eyes to see the beauties before unheeded. Nothing more interesting than botany for the student, nothing more enjoyable for the man of affairs than communion with nature. May we learn to read in nature, the revelation of himself which our great and wise creator is offering to all who will take knowledge.

III. TEXAS CORN GROWERS' ASSOCIATION.

ADDRESS OF WELCOME.

C. H. ALVORD, College Station.

I am pleased to say, ladies and gentlemen, in behalf of the College and the Texas Corn Growers' Association, that we are glad to have you here with us.

The earnestness and the spirit of progress that you manifest in the work of improving the yield of corn in the United States, and especially in Texas, is indeed praiseworthy and is deserving of much encouragement from everybody. There is a side to this matter of corn improvement that appeals immediately to a business man; you can interest a railroad man, the manufacturer and the professional man, but it is so hard to interest the man who is growing corn. If every man who intends to grow an acre of corn next year would follow out the suggestions and ideas pertaining to the selection of seeds, the preparation of the ground and the proper care of that crop and these questions that we are to discuss here, and if these questions could be thoroughly understood, the yield of corn next year would be largely increased. It would be increased 33⅓ per cent without any additional work, that is, in so far as labor on the crop itself is concerned. And yet I say the saddest part of it all is the fact that it is such a hard matter to reach the man who is engaged in growing corn.

During the past few years there have been mighty changes in agriculture. The things that we know now and did not know ten years ago would fill a good many volumes, and yet with all that there are thousands of ideas yet undiscovered. It seems to me that the great work is only begun; but we must carry the ideas that we already know home to the practical farmer himself and carry them to him in such a way that even the most indifferent will sit up and take notice.

I am glad to see the older men here. I like to see the older man put his shoulder to the wheel and help the young man. If a young man endeavors to carry out new ideas on his farm, so often the older man is inclined to scoff at him and laugh. I know what that means, for when a mere lad I had charge of our farm and many a man would laugh at the ideas I was trying to work out; and it took me six or eight years to convince them that there was any good in any of them. When they did come around to buy seeds of me, I had the satisfaction of knowing that I had at last convinced them that a young man could carry out some new ideas successfully. And so when I see the older men taking part it does my heart good. I know they will go home and encourage the younger men in their efforts.

Do you know that the most interesting man in Texas today is the young farmer? This State, as I look at it, is entering upon an era of the greatest prosperity it has ever seen. This State has just existed for a great many years, but it is beginning, and will continue to prosper more and more from an agricultural standpoint. Not only are the great farms prospering but the small ones also where the man tills the soil with his own labor. Texas is today being divided into smaller farms which in a few years will result in great good. We have the soil, we have the climate, and we have the young man who is in every way suited for the task imposed upon him.

And so I am again glad to welcome the young man, and also the older man, to this meeting of the corn growers. The A. and M. College and the Experimental Station are deeply interested in the agricultural dvelopment of the State of Texas, and we need and invite your assistance in the great work. We are satisfied that better corn means better farms and better farmers and more wealth in Texas.

THE RELATION OF SOIL TYPES TO PARTICULAR CROPS AND VARIETIES OF CROPS, WITH ESPECIAL REFERENCE TO THE PRODUCTION OF CORN IN TEXAS.

J. A. BONSTEEL, Washington, D. C.

Mr. Chairman, Ladies and Gentlemen: I desire first to enter into a personal explanation in regard to the subject of my talk before your meeting today. I unfortunately received the invitation from your Secretary to be present and address this meeting about five weeks after it was mailed, and I must apologize for appearing before you in a somewhat unprepared state. I was not aware when I arrived here today as to whether my name had been placed on the program. About ten minutes ago I was assured that my talk came next in the list of addresses. It is for this reason that I shall have to speak largely in general terms rather than in more specific terms, as I should have desired, in case I had had an opportunity to prepare myself more definitely on the subject assigned to me for discussion.

I desire to show you, and through you the Corn Growers of the State of Texas, something of what the Bureau of Soils, which I represent, is attempting to do in the United States, and has already started to do in the State of Texas. I desire to show you the form and character of the information which is collected by the soil surveys of the Bureau of Soils, not only as a matter of general information concerning soils of the United States and soils of Texas, but which is used in a classified form as a basis upon which to found certain general laws of the adaptation of particular soils to the production, not only of definite crops like cotton, corn, wheat and fruits, but also for use in the study of the adaptation of particular soils to very definite varieties of cotton, corn, and other crops.

I will show you here a little map representing the soils of what is called the Waco area in Texas. These soil surveys are prepared by specially equipped parties sent out from the Bureau of Soils to various portions of the United States, where the farmers and agricultural interests generally are vitally concerned with the development of the best that there is in their own agricultural lines. The soil survey experts thus assigned to particular areas make a careful study of all the soils found within a given region, determining the extent, the location, and the boundaries of the different kinds of soils, and in addition to this they make a study of the best methods of soil management, including the mechanical operations of preparing the soil to suit different kinds of crops and as far as possible the best forms of fertilizers or manuring to be employed, not only for each soil, but also for each crop upon each soil. If the work of these soil surveys was confined merely to determining the character of soil in each county or in each area, and of gathering together accurate information concerning the crops to be produced to the best advantage on each soil, and the best methods to be pursued in the production of such crops, I think that you would all admit that great good could be accomplished. But in addition to such a local study, the Bureau of Soils, because it is making these studies throughout the entire agricultural area of the United States, is able to compare conditions not only existing upon single farms or plantations within a county, but also to compare the general conditions existing for a county or a larger area in a certain State with those existing in other portions of the United States. It is only through such comparisons that the full amount of knowledge necessary to bring about the utmost possible utilization of every acre of our arable land, can be worked out. There are peculiarities of soil that are closely related to peculiarities of crop production. If such peculiarities are only noticed over a small limited area it is scarcely possible to derive any great fundamental law from this mere coincidence. If, however, it is found that not only in a single county or locality but also over broad belts of country extending throughout a considerable climatic range and crossing many State lines there are fundamental characteristics of soils which are always associated with fundamental peculiarities of crop adaptation, then a general law can be derived, and when once derived it can be applied either to the introduction of new crops or of new varieties of crops, or on the other hand to new methods of cultivation and of fertilization.

The Bureau of Soils has been studying soils in the United States by means of these soil surveys since 1899. The various soil survey parties have found more than 450 distinct varieties of soil within the agricultural area of the country. Now there is just as much individuality in the soils as there is in people, and it is conceivable then, that when our knowledge is complete that we shall find that each one of these 450 or more varieties of soils is peculiarly suited to the production of some one particular crop or more likely to a very definite variety of some crop. For example, in all past agricultural studies the investigators have seemed to be endeavoring to find out what would be the best corn soil in the United States. The same remark would of course apply to the wheat soils or to the cotton soils.

If I were asked "What is the best corn soil in the United States?" I should be unable to answer, although I believe that I am fairly familiar with all of the regions where corn is produced with exceptional profit in the United States east of the 100th meridian. I should have to answer the question in this way: The best corn soils of Illinois are not the best corn soils of New York or New England; the best corn soils of these two general regions are not the best corn soils of the Southeastern cotton growing States. I should presume that even if we were to confine the answer to this question, and apply it only to the State of Texas, that we should at once develop a considerable diversity of opinion in regard to what constituted the best corn soil within this great State. I feel sure that many of my hearers would desire to contend that the black prairie soils in Texas were magnificent corn soils capable under proper treatment of producing as good crops as any other soils in the United States. I believe without asking the question, that others who have had experience in producing corn upon the alluvial soils or the second bottom soils of the great Red River valley or of the Brazos valley or the valleys of any of your other great Texas streams would contend that the only really ideal corn soils were located within such river valleys. Permit me to suggest that from his viewpoint, each man making such a contention is correct. The reason for this I will now try to point out.

I am not aware as to how many different and distinct varieties of corn are now being produced in the United States or even in the State of Texas. I wish that this information were available; I do not know where it can be found. I do know this, that corn breeding for definite varieties has been in progress in the United States to some degree for forty years, and that for the last twenty years it has become with some people a distinct business. I believe this, that before the corn growers of the United States or the corn growers of Texas can fully utilize their soil and climatic resources, different varieties of corn should be introduced which are peculiarly fitted in their characteristics of growth to distinct soil conditions under given climatic surroundings. For instance, I do not think that the corn growers of Texas should attempt to raise varieties of corn suited to New England or Iowa or Missouri or Tennessee. Through long years of production under specific conditions of soil and climate corn derived from such localities will bear with it to Texas certain inherited tendencies of growth which may or may not be suited to its new conditions within the State of Texas. I would say further, that the most important thing for Texas corn growers to consider would be the development of several varieties of corn; one or more of which should be suited, say to the black prairie belt, another to the second bottom lands of the rivers, still others, possibly to the Coast prairie belt, and that in due process of time each particular soil type should have systematically evolved for it a particular type of corn best suited to the soil and to the climatic conditions under which the soil occurs. In other words, there should be distinct varieties of Texas corn suited to the Texas soil conditions, Texas climatic conditions and Texas feeding conditions, before the utmost resources of the State as a great corn producer are realized. This has to do not only with adaptation of existing varieties of corn to Texas soil and climate, but also to the purely plant-breeding side of crop development whereby new varieties may be derived, better suited than any of the old ones, to the wide range of soil and climate known to exist within the State of Texas.

Let us now discuss some of the chief peculiarities of any soil well suited to the production of corn. In the first place, I would say that the natural fertility or crop producing power of the soil should be relatively high. A vast amount of soil totally unsuited to corn is annually planted to that crop each year. Some of these soils if properly prepared by thorough plowing and fertilization or manuring might become good corn soils, but I believe there will be a saving in time, energy and money, if wherever possible a corn crop is placed upon soils which are naturally in good condition; such soils as you would desire to use if you were attempting to raise the largest possible amount of corn per acre.

Corn is a crop which not only sends its roots out over a wide lateral range of soil, but also under the most favorable conditions sends its roots to considerable depth. A proper corn soil then would be one which had naturally a considerable depth of surface soil; I should say roughly from 9 to 12 inches of good surface soil. This surface soil should grade without any distinct line of separation into a reasonably mellow, and not too compact, subsoil. In my opinion, under the climatic conditions existing throughout the Gulf States, the presence of "hardpan" of any kind within 12 inches of the surface of the soil should cause any farmer to look with suspicion upon that soil for corn production. In the same way, hardened layers of gravel or of rock near the surface would also be undesirable, as each of these would prevent the deep penetration of the corn roots so essential for the maintenance of the crop against drought, and so necessary for holding the corn in an upright position against severe windstorms. The surface soil should be deep for another reason. Wherever there is any long or short period of drought, particularly in the latter part of the corn growing season, it is very essential that corn lands should be broken to a considerable depth, in order to furnish a good reservoir to collect, store and retain the moisture of winter rains in order that these may become available for the use of the crop during the later period of its growth. Various determinations of the amount of moisture used by the corn crop have led to the conclusion that under ordinary circumstances the corn crop requires the use of at least 300 pounds of soil moisture in order to produce a single pound of dry matter, whether of kernels, of cob, of blade, or of stalk. This will show you why it is so necessary to have a deep surface soil which may be plowed deeply to store a large amount of moisture for use throughout the growing season.

The ideal corn soil, while it must be of such a character as to absorb and retain moisture to good advantage, must also be so located in regard to surface drainage and internal drainage as to constitute what we would ordinarily call a well drained soil. I believe it to be a fact of general application that only that soil moisture which is capable of movement within the soil is of any particular use to the growing crop. By this I would have you understand that when a soil is so located or so constituted that it remains completely saturated with water, either in the surface soil or within the immediate subsoil this condition alone does not tend to a favorable growth of corn or of any other deep rooting crop. The roots of any plant can only grow where oxygen has free access because only in the presence of oxygen can the growth of any part of the plant take place. Now, if the surface soil or the subsoil is hermetically sealed against the circulation or presence of air, the oxygen supply is largely cut off, and you have undoubtedly noticed that the chief development of the roots of any crop on such a soil is very near the surface. This is because deep penetration has been prevented by the presence of water saturating the lower portions of the soil. Not only does the presence of an excess of moisture in the poorly drained soil or subsoil prevent the proper ventilation of the crop roots, but also retards the warming up of such a soil to a sufficient degree to permit the germination of the seed. It takes a much larger amount of heat energy to warm up a saturated soil than to warm up one which is simply moist and through which the air can circulate. The seeds of almost all plants require a temperature of not less than 48 degrees F. before they can properly germinate and start the plant on its growth; for this reason a well drained soil is essentially necessary for the early planting of any crop, and this is particularly true of the corn crop which frequently can not be planted at such a time as to reach maturity before droughts overtake it in the latter part of the season.

I will say for your information, though I am not desirous of making the statement for broad general application, that throughout the Central States, or what is commonly known as the "Corn Belt," the dark-colored silty and clayey loam soils are considered to be the best soils for that crop. On the other hand, throughout the South Atlantic States the dark colored alluvial bottom lands which are reasonably free from overflow are by general repute considered to be the best corn soils. Now, the soils in Texas which are most closely similar to those of the Central Corn Belt are the dark colored soils of the Grand and Fort Worth prairies. They have not only the dark color (an evidence of large amounts of partly decayed organic matter) but also certain calcareous characteristics in common with the central prairie soils. In texture, that is in the size of the solid particles making up the soil, they are also similar to the Corn Belt soils. They are also characterized by a tendency to granulate at the surface when in a good state of cultivation. The same is true of the Corn Belt soils. The soils of both regions are commonly underlain by subsoils, which while stiff are retentive of moisture and under ordinary circumstances fairly well drained. It is true that in the Corn Belt States tile drainage has done much to increase the area adapted to corn production, and also to increase the yield in bushels per acre. I might hazard an opinion that more adequate drainage of some of the Texas prairies might also be found to have the same effect in increasing yields. I feel sure that the time will soon arrive when there can be no question but that the increase in yields secured from artificial drainage will justify the expense of such an undertaking.

These are a few of the general facts which I should like to submit for your consideration. You will see from the soil map which we have had before us on the wall, that even within a single restricted area there is a great difference in the characteristics of the different soils. I wish to convey particularly to you with this single soil map that before we can utilize every acre of our American agricultural domain to its utmost, we must not only understand what particular crop to plant on each soil, but we must also go further and introduce or develop a particular variety of each crop, which is suited to local peculiarities and climate. I have a little farm of my own up in Western New York, and I raise a few acres of corn each year, but I could no more produce the peculiar varieties of corn which are grown throughout the Gulf Coast States than I could produce watermelons and sweet potatoes at a profit. The corn which I do raise every year in spite of blizzards and of frost is the common old eight-rowed variety of flint corn, the true "Indian corn" of the New England States. The particular variety of this which I have is the River Corn or the "Corn of the Old White Woman's tribe," named from the fact that it was raised for generations by that group of Seneca Indians occupying territory along the Genessee Valley under the chieftainship of Mary Jameson, a white captive, who exerted a dominating influence in that particular group. How long this same variety of corn had been raised by these Indians before their contact with the whites no one knows, but the earliest explorers and settlers found these Indians possessed of a specific variety of corn admirably adapted to the soils and climate of the region. The efforts of corn breeders have since improved this distinct variety of corn without particularly changing the type, that is the improvements have been in longer and more regular ears, tending toward a greater yield per acre, but the hardness of this corn, its adaptability to a short growing season and the characteristics of the single kernel have not been altered materially. I believe, then, that when the corn growers of Texas have produced crops tending toward the best varieties of corn suited to each locality and to each given type of soil within the State that some such type of corn will be evolved best suited to the local conditions and most profitable for its given locality.

I am free to admit that we do not know at the present time what crops are best suited to each one of our numerous varieties of soil. Personally, I do not believe that with our great staple crops sufficient varieties have been developed to give us the best corn, or the best wheat, or the best cotton for each particular soil, but I am strongly of the opinion that when we have studied the characteristics and the distribution of our particular types of soil throughout the United States, and when the corn breeders, or the wheat breeders, or the cotton breeders have carried on years of patient effort to develop types of corn, or of wheat, or of cotton suited to each type of soil, we shall hear far less of total or partial failures in crop production, and no one will care to ask in the broad general way, "What is the best corn soil?" but the question will always be, "On what soil would you recommend Mosby's Prolific corn?" or some other variety in which the inquirer might be interested.

I wish to thank you all for the patient attention which you have given to these somewhat general remarks. I wish to say that whatever information the Bureau of Soils can furnish at any time to the farmers of Texas, whether to the corn growers, or the alfalfa growers, or any other branch of the wonderfully diversified agricultural interests of the State, it will be not only our duty but also our pleasure to contribute whatever of knowledge we have derived direct from the particular farms of this State, in order that the greatest good may come to the greatest number through the compilation of the best methods and the best results of these best farmers.

SAVING TEXAS SOILS.

JOHN GORHAM, Waco.

I have had a great deal of experience with peas and building up land and making it rich, back in Georgia, but not much here. If our ways are not changed in Texas we will be doing in a few years what Georgia has been doing for fifteen years—that is filling up ditches and gullies. When I was a boy our lands were all lying out and did not make any crop or bring any price. They had all been washed away by the rains. When I grew up and had to go to work I had to begin by making my dirt, and so learned that I had to make it the cheapest way that I could. The best as well as the cheapest way was to use peas. We cut off the hay and put that away and the roots benefited our soil every year. On a poor piece of land we would often turn the vine and all under. A gentleman who lives not very far from me has two kinds of land—black and sandy. The sandy, strange to say, he uses for farming purposes, but the other he lets his cattle run on. He has made that poor land yield corn and cotton that today goes right side by side with the best black land corn and cotton in our section, and I don't believe there is any better black land in the world or any other kind better than that around Atlanta. This gentleman has worked this way: Wherever he plants corn he plants peas and followed oats by planting peas and today his barn is full of good pea hay. He has brought that sandy land up that would not make alfalfa, but now he makes fine alfalfa on it after planting peas several times. He told me several years ago that he was going to make good alfalfa there if he lived long enough. He did it by fertilizing it all and by using every bit of manure on his farm. He cleans his barns every morning until they look like a man's house and a nice house, too. He is able to make it that way now. I know him well, and I know he doesn't put out a dollar at all unless it will bring him back 8 per cent or more and never puts it in places where it will not. He has an immense business in Waco and other places and is considered a wealthy man. He landed in Texas a poor boy and I consider him a man who has done our section a world of good and he is making today the best corn and the best cotton in our section by planting peas and using barnyard manure. As I said he never sends a dollar out unless it will bring back 8 per cent and maybe more.

I was talking to him and he said, "I don't know how many kinds of peas I have tried on my farm, but I think I have experimented with them all. I have worked down to one that has a big root and it opens up the soil and makes the ground rich. I know that this postoak sandy land gets very tight but this pea has loosened it up and will loosen up any land, and I have never seen any crop of peas sown anywhere that it did not bring benefit to the land." I have not had very much experience for I have only been here a short time and have been very busy studying my land and haven't used the peas very much yet.

Later on it is going to be just as I said a minute ago. The land is going to be full of gullies and the farmers of Texas are going to have to fill these gullies up with something and they had better be preparing for this work as they have it to do. Mr. Bannister, as I told you a few minutes ago, is a practical man, and he is using just one kind of pea and getting splendid results. He has a lot of land he has sown peas on and he has made it rich and I like to talk to a man of that kind. He told me about that dwarf pea that he handles for hay.

It bales out well and you can take care of it well. It grows something like alfalfa, has heavy roots, goes deep into the ground and will open it up and make it porous and will also furnish him with hay. I say to any man to plant peas on his land. Any peas will do, just so they are planted.

Mr. Cook: Tell us about goober peas?

Mr. Gorham: Mr. Bannister has 20 or 25 acres in goobers this year. The men on his farm eat them and strangers that go there eat them and he feeds them to his cattle. Goobers help the land. They make it rich and improve it, and any crop that follows them does better than it would if following anything else but peas.

Mr. Nance: How do you plant the peas?

Mr. Gorham: Plant them on a level and let them get a start on the best land you have and let it get balanced.

Question: How much do you plant to the acre?

Mr. Gorham: I plant them between every stalk of corn and then take a bushel and broadcast them over the field. I take a bushel to the acre. The first rain that comes brings them up all over the field. The peas that you plant between every stalk of corn will bring seed and the others that are sown over the land are making the land rich. I have seen farms just covered with them and cattle roaming over them looking fine.

Question: Will peas grow on black land?

Answer: Yes.

Mr. Murphy: I have some land that is wearing out. My tenants do not like anything but corn and cotton, and I want something that will induce them to plant peas and feel good-natured over it.

Answer: Take the whippoorwill pea, for that is easy to pick, but you must pick them before they stay on the vine too long, for they will open and waste. Some peas will stay on the vine until you come after them, but these won't.

Mr. Ferguson: Colonel Smith, how can you interest the farmer in growing peas?

Colonel Smith: I have tried every way in the world to interest the farmer in growing peas, and it is a hard problem, because the landlord generally controls the land after the crop is gathered. My way is this: You furnish the seed and make him agree to plant them in the corn some definite way and you agree to let him have all he can gather. I just tell him he can have all he can pick, and in that way when he gathers his corn he may keep on picking all he can, but he must let me turn my stock in. That is all I ask of him. It will pay the landlord a hundredfold. I have done all I could to interest the tenant in planting peas but have made a failure. No bigger failure than the landlord himself has made, however. He stands in his own light. I went last year and planted peas in the middle of the rows and had the whole field in peas and the hogs got them. I regard it as a great investment. Another thing is this: Make a contract with the renter not to replant with corn, but with peas. As a rule replanted corn always fails with me. When I was a boy I used to have to replant corn, but it hardly ever succeeded. I always replant with peas. Encourage the renter to plant peas near his house and you tell his wife how fine they are to eat and their great value as chicken food. When once you get the renter started to planting peas he will never stop. I can do nothing more than speak in the highest terms about planting peas on your land. It is the best pay in the world.

Question: Do you find much trouble in curing pea vines?

Answer: It is a little hard to cure, but like alfalfa it is hard to ruin. I get a lot of sticks and have a man stack the pea vines around these sticks until they will hold it up. It is a fine way to do. It made pretty hay and it takes very little time for an expert man to do this.

Mr. Gorham: I would like to make a suggestion about curing pea vine hay. We cut some hay and the thing that bothered us was how to cure it, until somebody put us on to how to do it. Cut your pea vine hay down today and leave it 48 hours. Within the next 24 hours take it and put it in your barns and shut every door. You will think it is going to burn up, but it won't. This is what someone told me to do and I took his advice and put my pea vine hay into the barn after 48 hours: I kept my hands in the barn packing the hay down as I put it in. The next morning that hay would cook any piece of meat in Georgia. Now that was the prettiest hay that I ever saw in my life. I adopted that plan and never lost any hay, and in the winter when I am ready to feed my stock there is my hay as bright as a silver dollar. There is never any mould in it at all.

Colonel Smith: The point that the gentleman has raised is one of the unsolved problems which must come before the farmers today. It is the question of curing hay. Last year I hauled a lot of it out of my field and stacked it near the barn because I wanted it for a shed for my cattle in winter. I thought it might keep a poor old cow from dying. There was not an animal on my place that touched anything to eat except that hay. They got fat on it. On another occasion we had lots of rain in July and lots of my hay moulded. I took that and filled up a gully with it. My cattle never touched a bite of anything until they ate it all up, even out of the ground. A man in Hot Springs had brought a lot of hay from Texas and had gotten it packed together and it moulded. He said he didn't want any more Texas Hay. I said it was like tobacco, and if he wanted to he could chew it for tobacco. I did not know then that by this time they would be chewing it for tobacco. I told him to take that hay home to his horse, for that was the finest feed for horses that I ever saw in my life. He laughed at me, but anyway took it home and tried it. He told me later that if he had to pay me for my information he didn't have any idea how much he would have to pay. Perhaps it is going to be a blessing to the farmers there.

I was talking to Dr. Spillman last night. He said up in Ohio they cut alfalfa in the morning and bale it in the evening, but they have to get the juice out of it. This pea vine proposition is a great one, and every man ought to be a committee of one to find out about it. I have cut some alfalfa that cows wouldn't eat at all. I thought maybe cattle and horses were like men and liked some with alcohol in it, but I want to tell you here now that your tobacco men are using alfalfa for tobacco. A package of tobacco was examined and found to contain 65 per cent of alfalfa.

Question: Have you ever used it for tea on the table?

Answer: Well, no, I haven't tried that, but they say the Mormons use it. I can say this, though, it is the finest kind of a tonic, and they say the Mexicans use it quite extensively. If they do, they are wiser than we are. There is no doubt but that it makes a very fine drink. It gives brains and intelligence to the general in command and brawn and muscle to his horse.

Mr. McGinnis: I just want to say that personally I am planting cow peas on all the land I have. I plant them in my corn and between my peanut rows and orchard trees, and it is making the land rich. There is nothing, I think, for making land rich like cow peas.

Mr. Ferguson: The peas so increase the richness of the soil that we can raise one-third more corn and cotton. The good you get from peas is twofold. You are benefiting your land and getting feed for your stock at the same time. It also has another effect. By making the land rich it keeps Texas people from moving away in order to get where the soil is not worn out by planting just one crop all the time.

Mr. McGalliard: There is a fellow up in my country named Moore, who bought a hill-side farm, full of gullies. The people all said he would starve to death on that place. He went there seven or eight years ago and commenced planting peas. I was over there last fall and that land had as good corn on it as any part of the land in that country. He had bought this 160 acres on top of the hill, as I said, and the whole thing is now given over to peas and hogs. They pay splendidly, too.

HOW THE PREPARATION OF THE SEED BED AFFECTS THE STAND.

L. A. PAWLEDGE, Hico.

It matters not how good the land and the culture, if there is no stand the yield will be poor. We have never given this point in corn growing as much thought as we should have done. I am very well convinced that I have already been rewarded for what study I have given the subject. The seed bed is to the corn crop the most important part of the start, and we all have had it demonstrated to us. After consulting every work or bulletin I have at hand I find but little on this most important question, but I have had it taught me by experience, the best guide for the farmer. Sometimes it seems impossible for the farmer to do justice to the seed bed, but when he fails to do his duty he will have regrets almost every time.

Now to get a stand of corn under all circumstances is very hard to do, but we should never let one or two failures cause us to get careless. The most important factors in the germinating of a grain of corn are very simple. The little schoolboy with his bit of sawdust can sprout a grain of corn with the help of a little water and sunshine—water to moisten the sawdust and sunshine to warm it. The sawdust has nothing in it that would produce the smallest leaf without the water and warmth. Now this is very simple, isn't it? but the lesson it teaches is of importance to the corn grower. We should have the seed bed in the very best of condition, for if we fail in getting a stand the yield is impaired. There was a time, when our land was fresh, that it was not so important as now. By continual cropping it has lost that mellow condition that new land has. We should try to restore our land by plowing in the fall and winter so as to keep it well pulverized; in winter and early spring so as to store all the moisture that is possible.

Now as I have shown you that warmth and moisture with any mass to hold the same will germinate the corn, then it ought to cause us to study the conditions of the soil, so as to get at the reasons that will make the same produce a good stand under most any conditions. It would be impossible to prescribe any one plan for such a large country as ours. Take the eastern part of the State that has abundant moisture and the same plan that would suit there would not suit the central part where they have limited rainfall. In the damp and low lands it is best to so bed the soil so as to drain it and prevent souring of the seed. But in that part of the country where the rainfall is lighter it will be best to have the soil kept level and very finely pulverized so as to hold the moisture. Then plant below the level so as to retain the moisture.

While I have digressed somewhat from what seems my part of this subject I take this opportunity to say that conditions which will make a good stand of corn will make a good yield. If the seed bed is not in such condition as to produce a good plant, if it is weakly when the corn comes up, and has not the vitality to grow off, it will impair the yield in the end.

SELECTING SEED FOR HIGH YIELDS.

A. M. FERGUSON, Sherman.

In the selection of seeds most of us are guided more or less by some theory respecting the relation of some visible character of the plant or ear to the power of the seed to make a large yield. The usual theory is that large yielding varieties have large ears and large grains with large germs, all borne on large stalks. I was never particularly apt in figures, but I have great respect for results and ideas expressed in figures secured with the rule and scales. Any one making a business of seed improvement as I have done, soon comes to rely more on actual results of measured yields than on the popular notions of the characters in plants supposed to make them. In other words the figures should make the theory and not the theory the figures.

Many farmers are growing poor yielding varieties of corn without knowing it. I take it, that the seed a man plants is an expression of his judgment of what is best under average conditions. I quote below the results of some tests of the yields secured from samples of corn taken from the farmers' planter boxes and seed bags. All the samples in each lot were planted in separate rows on the same ground and received the same cultivation, so that all had an equal chance to show what they could produce. All the rows were practically alike except as to the character of seed used. In these results it is not the amounts of the actual yields, but the differences to which I would invite your attention.

Below are the results of a test of twelve samples of native grown corn, made by the North Carolina Department of Agriculture:

Variety.	Number of bushels of shelled corn per acre.	Per cent of grain to cob.	Average number of ears to the stalk.	Pounds of stover to the acre.
1. Cock's Prolific	59.3	76.7	1.85	3,966
2. Weekly's Improved	53.1	81.2	1.99	3,267
3. Bigg's Seven Ear	52.2	82.4	2.57	2,567
4. American Queen	41.1	80.0	1.21	2,568
5. Carrituck	40.9	83.6	1.16	2,580
6. Williams	40.7	81.2	1.05	3,131
7. Brake's	40.4	86.2	1.09	2,822
8. Southern Beauty	38.0	82.4	1.01	2,859
9. Peel's Prolific	37.4	81.2	1.03	2,245
10. Farmer's Favorite	35.8	80.0	1.04	2,568
11. Wilson's Success	35.7	84.8	1.18	1,850
12. Thomas's Improved	32.7	72.7	....	2,555

Highest yielding variety....................................59.3 bushels per acre.
Lowest yielding variety.....................................32.7 bushels per acre.

Difference in yield...26.6 bushels per acre.

Valued at 40 cents per bushel, equals $10.64; the loss per acre resulting from planting the lowest yielding variety rather than the highest yielding variety.

The second column shows the differences in the shelling record. Remember that 80 per cent is the legal standard. Cock's Prolific, although it yielded 6.2 bushels of grain more per acre than the second best variety, did not have a good shelling record. The best and the poorest shelling record are found in the two lowest yielding varieties, giving a difference of 12.1 per cent, or 8.4 pounds of grain in the ear corn of the two varieties. The per cent of grain on the ear is not necessarily correlated with gross yield of grain.

The third column shows the number of ears per stalk. The three best yielding varieties are prolific varieties, having approximately two moderate-sized ears per stalk. Before we pin out faith too strongly to the large ear idea we should think over these figures a little. Note that the prolific varieties stand at the head of the list.

The fourth column shows the weight of the stover, which may be accepted as an indication of the size of the stalk. In a general way the yields of grain seem to be in proportion to the amount of stalk. A closer inspection of the figures will show that a large stalk is unnecessary; however, compare:

Bigg's Seven Ear	52.2 bu. grain and	2567 lbs. stover.
Thomas' Improved	32.7 bu. grain and	2555 lbs. stover.
Difference	19.5 bu. grain and	12 lbs. stover.

Until within the last few years we thought that good, carefully selected seed ears would give approximately the same results in yield. That this is not so, has been frequently proven. In my own tests a difference of 39 bushels per acre was noted in ears that to the eye looked equally good. Here are the results secured at the Texas Experiment Station from corn grown under the drouthy conditions of the spring of 1906. All the ears were selected by Texas farmers and tested at the station grounds. From a single variety of corn furnished by the same man:

Ear No. 40 yielded 13 bu. per acre.
Ear No. 41 yielded 23 bu. per acre.
Ear No. 42 yielded 14 bu. per acre.
Ear No. 43 yielded 6.5 bu. per acre.
Ear No. 44 yielded 26.5 bu. per acre.
Ear No. 45 yielded 12 bu. per acre.

There is, then, a difference in yielding powers in the separate ears that can not be recognized by any physical characters which the human senses or scales may detect. By our improved selection methods we select seed for yielding power just as much as we do for the ordinary qualities of color, size and shape. The physical qualities of ears while of value in themselves, are not guides in selecting for yields.

I want to mention just one other character that is correlated with yield. It really seems like a platitude to mention the fact that a variety must be acclimated to produce good yields. I am moved to mention it only by the observation that every year so much Northern seed is sold to unthinking Texas farmers under the delusive notion that they will yield more because they are early. Here are the results made in a fair test with four popular Northern varieties grown beside four native varieties:

EARLY MATURING NORTHERN VARIETIES—

110-120 days.

Iowa Silver Mine	23 bushels.
Leaming	22.1 bushels.
Riley Favorite	24.5 bushels.
Reid's Yellow Dent	32.5 bushels.
Average	25.5 bushels.

ACCLIMATED NATIVE VARIETIES—

120-135 days.

Munson	46.8 bushels.
Strawberry	42.2 bushels.
Boone County	41.8 bushels.
Dawson	39.8 bushels.
Average	42.6 bushels.
	25.5
Approximate loss per acre by growing Northern seed	17.1 bushels

In other words, to improve our yields we should not rely on mere qualities of size, color, shape, etc., in ears, but select on the basis of actual tests of yields. There are three lines of work to which we should direct our attention:

1. Use only home grown seeds; seeds that have done well under our conditions.
2. Test our varieties and propagate only the best.
3. Improve these by selecting stock seed from high yielding ears.

Question: Does the pollen from one corn have any effect in the producing of another corn?

Mr. Ferguson: No.

Question: Are the ears as long when there are two ears to the stalk as when there is only one?

Mr. Ferguson: No, the ears are not so long, but when they are shelled you have more corn.

Spectator: Many times a man knows a thing but does not know how to tell it. I am pretty green myself, but I want to say a few words and then I want you to explain a few things to me. Now, here is corn raised by a man living right next to me. This next was raised by a neighbor of mine who, when he commenced raising corn, commenced on that. This last ear was raised by a hand on my own place but the weevils ate it. That corn will blow down in spite of the world. Now, I want a corn that will stand up. If we get a wind anywhere from the first of May to the first of June and the corn won't stand up, I am through with it. As I said, I want corn that will stand up. Can I make that corn stand up like this one?

Mr. Ferguson: You have a corn here [holding up ear] which will make a big yield. It is thoroughly acclimated corn and will make two ears to the stalk, and the weevils hardly ever eat it. This big one will blow down. I would say this, however: If you find that this corn stands up and makes more corn, I would certainly grow it in preference to others that I was not so sure about. I would not care about the length of the ear. What you want is the corn. If you buy corn you don't tell the man what kind of sacks you want it sent up in. You are not buying it for the sack, but what you want is the corn.

Now, you want to know if you can lengthen the ear of one kind of corn so it will be as long as the ears of another kind. Yes, it can be done. You must go into your field and carefully select the ears of corn though, and each year your corn will be better, but you must do this every year. If we know that a good yield of corn can be made with a small stalk, even though the averages are the other way, then what we want is a small stalk and a big ear.

Another Spectator: You know, where I live we have limited rainfall. Do you think a seed corn raised in my section would suit the drouthy section better than corn raised where they have plenty of moisture?

Mr. Ferguson: Yes, I should think it would. Now, here are two varieties of corn. One is a late corn and the other is not. The late variety will usually give you more corn. You know, a man can do more work in two days than he can do in one, and it is the same way with corn.

SELECTING EARS OF QUALITY FOR SEED.

WINFIELD HARPOLD, Italy.

When we learn that the average yield of corn in Texas is only 18 bushels per acre while the average for the Corn Belt is 25 and for the State of Iowa, 37, we conclude that there is something wrong with our seed corn; for all of this discrepancy can not be charged to poorer soil nor inferior methods of cultivation. It is true that much may be accomplished by better methods of drainage, better preparation of soil, better tillage, and the proper use of fertilizer; but, after all, what will these things amount to if the seed is dead or worthless?

We must conclude also that much seed is bad when we consider that many select their seed by the scoop-shovel system—taking the corn from a box car not knowing whence it came nor what soil or climate it is suited to. But of some things they may be sure; it will contain all the tips and butts, all the heated, frozen and soured corn that the shipper can scrape together. How can anyone expect a stand from such seed? No corn planter can drop a perfect stand when the box contains kernels of every shape, size and kind—broken, cracked, rotten, and soured grains, hence the poor stand and the consequent poor yield. With a perfect stand and each hill making a 7-inch, 9-ounce nubbin, 140 ears to the bushel, the yield would be 25 bushels per acre, which is 7 bushels more than the average Texas yield. Another method of selecting seed is called the "crib method." While better than the former, yet this is not the best method; for corn that was taken from the field and properly kept produced 96 bushels per acre, while corn taken from the crib and planted on adjoining and similar land produced 80 bushels.

On another occasion 10 bushels were taken from the field and divided into two lots of 5 bushels each, one lot being put under crib conditions, the other being dried gradually but quite rapidly, being kept dry and at an even temperature during the winter. At planting time a two-box planter was used, the cribbed corn being used in one box while the house-kept corn was used in the other. The well-kept corn yielded 85½ bushels while the cribbed-corn yielded only 67½ bushels—a difference of 18 bushels per acre. Let us examine some of the defects of the crib method. Do you suppose that a person could improve his flock of Plymouth Rock chickens by going to the grocery store and rummaging through the basket of eggs? Indeed he could not tell if they were sound, neither could he tell the stock of chickens they were from without seeing the hen that laid them, and, perhaps, it would be well to see her mate as well. Now, the corn stalk in the field is the hen (or goose) that lays the golden eggs or kernels of corn. Therefore if we would select corn of quality, we must go to the fields to do so. We will have this advantage of the grocer with his eggs, the corn will be fresh and its defects will be apparent.

We will first examine the stalk, for it is the mother of the ear. The stalk should be about 10 feet high and in thickness and shape like a man's wrist. The roots should be plentiful and strong, bracing well the stalk from falling with its precious load. The leaves should be about 15 in number, thick and broad, gradually shortening toward the top.

The ear should be attached to the stalk about 60 inches from the ground and should be well covered with shuck to protect it from the weather and insects. The shank or stem of the ear should be about 4½ inches long and ¾ inch thick, letting the tip of ear point downward, thus shedding the rain and thereby preventing the ear from souring and rotting.

If you desire to breed an early or short period corn, you should look for the following characteristics: Short stalks with ears attached near the ground; the leaves scant, thin and narrow. The rows of grains should be few in number —from 8 to 12 rows to the ear—and the kernels should be smooth and flinty. These early flinty corns with few rows make up the loss in extra length. For example, an ear with 8 to 12 rows and 14 to 16 inches long, contains as much corn as one with 14 to 16 rows and only 8 or 9 inches long. If you desire a late or long period variety, you should select the opposite to the above.

Please notice, a crooked shank ear will produce from 3 to 10 bushels more per acre than a straight shank ear.

If you desire to raise corn with two or more ears to the stalk, you should go now and make your selection from stalks bearing two good ears. Seed ears should not be selected from stalks bearing suckers or smut, for both of these (suckers and smut) can be bred into or out of your corn. Ears with soured or sprouted butts should not be selected. No matter how fine an ear it may be, if it lies on or touches the ground, it should be rejected. Select ears 10 to 12 inches long and 9 to 10 inches around, the tips being blunt and well covered. The shanks should be short and well bent. Proceed to gather about five times as many ears as you need, and you will be done with the field work for this year. Next, shuck your corn and put it in a cool, dry place. Now, at planting time examine this corn to see that it is sound and fit to plant in the general field crop, and then at gathering time see if this corn does not make a better yield than unselected seed. Of course, all of this corn will not possess the fancy points and will, therefore, not be fit to use in the breeding plat of which I will speak presently.

To insure uniformity in germination, growth and maturity, arrange the ears on long tables or shelves in straight rows with the tips all pointing one way. You must now go over the whole lot, and reject all long, slim ears with deep furrows and short grains; for these tend toward the early, flint, high protein varieties—good in their class but not suitable for our present purpose. Now go over the lot again rejecting all very short ears, especially those whose circumference is more than three-fourths of their length; for such ears are slow in maturing and are likely to be gathered unripe and thus sour in the crib. Next reject all ears that have added half rows (half rows are allowable in the Leaming), crooked or winding rows, or with compressed butts, or with decidedly tapering tips, for all of these have many misshaped grains which no planter can drop with uniformity. If we would have a perfect stand and a large yield, the kernels of corn must be of such shape and size that the planter will drop the required number 100 times in 100 drops. Reject all ears with naked butts, for this condition indicates that the stalk bloomed or silked too early, there being no pollen to fertilize it. Ears with naked tips should also be rejected, for this indicates that the stalk silked too late—the pollen being gone. Next reject all ears that you can bend or twist, for they are immature. Next, you want your corn of uniform color; for two or more colors show mixed breeds, and mixed corn has a tendency to revert back to inferior breeds, besides there will be no uniformity in germination, growth, silking, maturity and yield. We now have a fine lot of corn of uniform color, length and circumference, the rows straight and the butts and tips well filled. If the kernels are roughly dented, we may infer that the grains are long and the cobb small. If the ears will not bend or twist, we may infer that the tips of grains are plump and full with no furrows near the cob.

A pretty good lot of corn, but will it grow and grow vigorously? That is the all-important question; for vitality is the best quality that seed corn can possess. Now the corn should be given a germination test, rejecting all ears that do not sprout at all and also those that give small weakly sprouts. If your planter works perfectly, you may expect a correct stand. You should shell the corn, keeping the ears separate, and test it for percentage yield. You may be surprised to find that the yield of two ears that look exactly alike may differ from 1 to 33 per cent when shelled. Professor Holden describes two such ears, one weighing 10 ounces, the other 13 ounces; the latter gave a yield of 33 per cent greater than the former.

Now plant forty of the best ears in good land, let each row be planted from a single ear and let the rows run across the dead and back furrows so that each may have an equal chance with the others. Some of the rows will come up much earlier than others, some will have many suckers, and others many barren stalks. You should reject all undesirable rows and only save seed from the best ten rows—those that give the largest number of good ears and the largest yield by weight in shelled corn. By this means you will improve your corn from year to year. The reason for using the breeding plat with one ear to the row is to find the prepotent or heavy yielding ears. In a plat like this Professor Ferguson found a row that made 65½ bushels per acre; but the fifth row from this one made only 26 bushels per acre. In this way, last year, Professor Bennett found that row 44 made 26½, while row 43 made only 6½. Of course, with the row system we have the best means of improving our corn in any particular we may desire.

THE IMPORTANCE OF THE SHELLING RECORD IN SEED CORN.

H. T. WEATHERS, Greenville.

The importance of the shelling record in seed corn interests everyone that has occasion to come in touch with corn, from the time it is planted until it is consumed. The man that should take the greatest interest in the shelling record of seed corn is the man that puts himself up for a seed salesman. If he is an honest, conscientious man, he wants to give the planter the worth of his money, and he can not serve his countrymen in any better way than to supply the planter that purchases seed corn with a pure breed of corn which has a high shelling record, as that record is reproduced in the crop, and is a quality in corn sought for by producer, dealer and consumer.

Let me say here that there is more fraud practiced in the sale of seed corn than in any other line of commerce (of its extent) that I know of, and I recommend that this body take some steps toward legislation, both state and national, that will overcome this evil.

The shelling record of corn is very important to the producer, but it is of more importance to the purchaser, no matter for what use he may buy the corn, for it is for the pounds of actual firm substance of the corn that he makes the purchase, and not for chaff, shucks and cobs, as the last mentioned are of no use to him but, on the contrary, are a burden to him from start to finish, and more especially is this true to the grain dealer of which I happen to be one.

It is the custom in the South to gather corn with the shuck on, or "snapped" as they call it, and the light, chaffy ears of corn usually get "snapped" with all the shuck, a long snout and often with half a cornstalk attached to it. This is sold to the dealer at 72 pounds to the bushel. A light, chaffy ear of corn usually has a stiff, hard, coarse shuck on it, and this shuck and the hard, dry stalk attached to it are valueless as a feed, and if the dealer ships this corn to a customer in this condition, he usually gets a claim on account of light, chaffy corn. If he pays this claim, he loses his profit, and if he refuses to pay the claim he loses his customer. Then again; if he undertakes to shell this corn, bought at 72 pounds to the bushel, the light, chaffy ears of corn are detrimental to him, for if the sheller gets any corn off this ear, it is of a poor quality, and becomes mixed with his good corn and lowers the grade of all. The buyer kicks and cuts the grade; therefore the price is reduced and he loses on his corn and probably loss the customer. Besides, he has had the expense of handling the "shucks and cobs" for nothing.

This is partially due to the careless methods of gathering corn, by a great many farmers, and I would recommend that this association urge upon its members the necessity of a better preparation of their corn for market. This unfortunate state of affairs has caused our firm to discontinue shelling corn, and you will find a number of shellers over the State standing idle from this same cause. Thus does the low shelling record of corn affect the dealer, but a great deal of trouble can be traced back to the low shelling record of the seed corn.

Seventy-two pounds of corn with the shuck on is supposed to shell out 56 pounds of grain, but our experience is that the average run of corn only shells out about 51 to 52 pounds to the bushel, and we have shelled corn in 1000 bushel lots that only shelled out 49 pounds to the bushel. Thus you see the loss to the dealer, and the cause for the wide difference in price of corn in the shuck and shelled corn, when your corn is offered for sale. We have bulletins from the State Experiment Station and from the U. S. Department of Agriculture, which are available to all and should be carefully studied and heeded, but I want to tell you as a man that has had experience with corn all the way down the line, from the selection of seed corn until its products are ready for the "soda and buttermilk" that "the man that gets the milk out of the cocoanut" is the man that does things, and if you do not raise and select your own seed corn, buy it from a man that makes seed raising a specialty and has the reputation of giving you what you buy. Then arouse your own energy, study the natural requirements in the preparation and cultivation, go at it in a scientific way, with a vim and determination to raise the standard of your corn, and the chances are that you will not only succeed in your own undertaking, but will encourage your less energetic neighbor to follow suit.

Although born in Indiana, a child of Missouri by adoption, wedded to one of Iowa's fair daughters, I claim the famous State of Texas to be the most resourceful of them all, and that with careful selection of seed corn, proper cultivation, and skillful preparation for market, there is no reason why Texas should not stand among the first in the production of this great cereal.

NATIVE VS. NOTHERN CORN.

M. C. FULLER, Groesbeck.

Four years out of five native corn will excell Northern corn, and in years when native corn is a failure Northern corn will practically be a failure too, for while it may look very well, it will be found on examination to be practically worthless. Native corn is soft, and every particle of the kernel is easily digested. It contains a much greater per cent of sugar than Northern corn, consequently makes better bread. Hogs will fatten faster on it, and mules will do a fourth more work and keep in better flesh. The stalk is larger, contains more sap, and will withstand the ravages of the chinch-bug far better. The ears are larger, form higher, and costs one-fifth less to gather and crib. Three years out of five it will nearly double in actual fat and muscle producive value. It is worth three cents a bushel more on any market straight, and a man who is really posted will give ten cents more for it. Weevils eat it less, as it matures later and is better protected by the shuck. Being softer, it is easier to masticate; consequently it is better for stock with poor teeth.

I did not get my information out of a book or a chemical laboratory, but out of the field and feed lot from thirty-one years of careful observation.

INDIAN CORN IN TEXAS AND NEW YORK.

PROF. H. NESS, Henderson.

In 1897, while under the tutelage of Professor Bailey at Cornell University, I was given as a problem the investigation of the differences between Indian corn grown in Texas and in New York. In order to have as fair comparison as possible Professor Bailey sent me for planting one-half ear of corn from each of about twelve varieties of garden corn, the other half being retained for planting on his own grounds at the University. The corn was planted at the usual planting time at each place. The soil in both places was a stiff, clayey loam, but in good tilth and of sufficient fertility to yield a good crop.

As the experiment proceeded, I became greatly interested, due to the decided dissimilarity of the plants in the two places. Being no longer in possession of my notes, I regret to be unable to give you some very interesting tabulations which I obtained at the end of my observations.

During the early part of July, when my corn had arrived beyond the stage of roasting ears, I left College Station for Ithaca, N. Y., where my corn there reached the same stage in the latter part of August. At this stage the early dwarf varieties, which attained a height of 6 to 7 feet in New York, were only

4½ to 5 feet tall in Texas. In New York each stalk produced for the most part one ear, situated at about the fourth joint, or 2½ to 3 feet from the ground: while in Texas the same varieties produced from the first or second joint a rather elongated shoot terminating in a cluster of ears. In Texas these dwarf varieties were without exception failures, having small, ill-formed ears, many of which bore a small tassel at the end of the cob; while in New York they all produced well-formed ears. The larger varieties, which were from six to ten days later than the dwarfs, were also correspondingly shortened in Txas, but showed less tendency to produce the ears in clusters and only rarely tassels on the cob. The ears were borne a foot to sixteen inches lower in Texas than in New York, but the main ear was in many cases as large and well formed as in New York. In all varieties there was a much stronger tendency to produce suckers in Texas, and all varieties used three or more days' longer time before reaching tasseling than in New York.

In comparing the reports of the Weather Bureau for the periods at which the corn grew in each place, I found no such differences as in the case of the plants. The amount of rainfall, the number of cloudy and clear days, and the temperature had varied but little in one place from that of the other.

This sudden variation in Indian corn when moved from one latitude to another is a well known phenomenon, but the causes have been but little explained. Schübeler, professor of botany at Christiana University, who for thirty years experimented with Indian corn, says that on the 19th of May, 1858, he planted white and yellow Dent corn in the botanic garden of the University, and on the 12th of August the stalks showed tassels and on the 19th, silk. When full grown these stalks averaged 15 feet in height. In regard to time consumed for ripening, he reports that a variety called Chicken corn, or dwarf corn, used 90 days from seed of plants acclimated at Christiana, which is under the 60 degrees latitude; while the same year seed of the same variety from Breslow, under the 51 degrees latitude, used 123 days; and the ears produced from his homegrown corn were larger and heavier.

As a conclusion to his article on Indian corn, Schübeler says: "My experiments in cultivating for a long series of years a great number of varieties of maize have shown that at the same time as the grains here by continued cultivation reach an earlier maturity, the size of the entire plant decreases to a conspicuous degree; so that a variety which the first year of its cultivation at Christiana reached of 10 to 12 feet, attains after two or three years' cultivation only 7 to 8 feet.

Since the great difference in habit between the corn grown in Texas and that grown in New York could not be laid to the difference in temperature, or in moisture, or in soil, there remains only one factor to which this may be attributed, namely, the light. No one who takes a trip from Texas to New York, or from a southern to a far northern locality will fail to notice the great difference in the light. The glare of the mid-summer light in Texas produces a painful sensation to the eyes of anyone trying to gaze at a distant object, while the light of the North seems to be made mild by the mixture of hues less bright than the pure white.

But why this difference in the light of higher and lower latitudes? The cause is the same as in the difference of morning and evening light from that of noonday. The light, striking more obliquely the further we approach the poles, loses more and more of its blue, or highly refrangible rays, which are separated from the less refrangible red and yellow rays in the oblique passage through the atmosphere. It is well known that the rays most active in photography are the highly refrangible ones. Lackyer states in his *Spectrum Analyses* that at Para, situated nearly under the equator in Brazil, the light contains the actinic, or highly refrangible rays, in such abundance that a photographic plate needs only half as long exposure as in the latitude of London, England.

From experiments in plant physiology it has been proven that these same rays act as a brake upon the growth, checking the growth in length but increasing the compactness and the strength of the tissues, and that in their absence plants assume etiolated forms; that is, become long-jointed and soft-tissued, similar to those grown in darkness. Schimper, professor of botany at University of Bonn, says in his *Pflanzen Geographie* in regard to the action of light upon plants: "While it is the heat which sets the plant machine in motion and throughout the entire duration of its development and activity regulates it, whose form it does not essentially influence, it is the light, as in the case of the water, which in the building of the plant body affects it to a conspicuous degree architecturally. A plant raised in exclusion from light is quite differently formed from the one normally lit up, and the structure vary for every degree of light intensity. The effect of light upon the plant dos not only depend upon its quantity, but also upon its quality. The different rays have a quite unlike physiological importance, since they are in an unlike measure absorbed by the atmosphere and water vapor."

"The less refrangible half of the spectrum from the red to the beginning of the green contains the rays active in the reduction of carbon-dioxide. The blue and ultraviolet rays are active in the assimilation of nitrates. It is also they that act retardingly upon the growth."

From these considerations the conclusion is reasonable that the change in habit, which Indian corn undergoes when transplanted from one latitude to another, is due to the difference in the quality and, perhaps, also the intensity of the light. It is not likely that this is specific to the Indian corn, in which the phenomenon is excessively obvious, but is common to all species of plants, and that by acclimatization they soon return to the habit normal to their new locality.

LAGUNA AND OTHER MEXICAN CORN.

JOHN GORHAM, Waco.

As to Laguna corn, this is the second year that I have been experimenting with it. In 1906 I planted only about four acres, planted on March 9th. It is a vigorous, strong grower, rooting very deep, with a strong heavy stalk which appeared to me to pay but very little attention to weather conditions. Wet or dry, it seemed to thrive and do well. Especially did it attract my attenion when the dry, hot weather in June last year came upon it. I compared it with my other corn, which began to fire and twist; the Laguna corn was green from the bottom blade to the top; and long after my other corn had dried up the Laguna was green—fodder and all.

Now, both corns were planted on the same day. Last year the ears on the Laguna were matured from ten days to two weeks earlier than my other corn. There is not that difference in it this year, as both seem to mature about the same time; if there is any difference, the Laguna is a little later. I consider the Laguna corn very much better than last year, and I like it better than I did even at harvest time last season, as I am sure it will make more corn. Last season this corn yielded 38 bushels of husked corn per acre, actual weight. It grew to an average height of 8½ feet with the ears 3½ feet from the ground. The strong, heavy, flat stalk possesses a wonderful resisting power against heavy winds. At harvest time last season my Laguna corn was standing upright, while my other corn had all been blown down. I consider that my Laguna corn is very much better this season than last, not owing either to weather conditions or soil preparation, but to seed selection under the direction of Professor Earnest Brown of the Department of Agriculture, Washington, D. C. I believe that proper seed selection, early preparation of the soil, and thorough cultivation of the corn will make Laguna one of the very best corns for our section, and I might say for all of Texas. First, it is already a pure white corn. Secondly, a very strong point in its favor is its drouth resisting quality, which is far greater than that of any corn I know of. Thirdly, it yields a high percentage of shelled corn.

Comparing Laguna corn with other Mexican June corn, I consider the Laguna far superior to any Mexican June corn I ever saw, both in weight and percentage of shelled corn. It will double it in yield per acre. I have had no experience in planting this corn later than March, when we plant other corn. My experience with other Mexican corns has been very limited, but my opinion of them is that they are a fine substitute, or, as we might say, emergency corn.

I have brought for your inspection a few ears of the Laguna corn. You will see that it is a large, white, dent corn, with good large white cob and a very fair grain, growing on an average of two good ears to the stalk.

TILLAGE OF CORN.

PROF. T. B. HEADLEY, San Antonio.

A discussion of the tillage of corn includes a discussion of the plowing, manuring, planting, and cultivation of the growing crop.

PLOWING.

In good plowing a layer of soil, uniform in depth, is removed and laid down again bottom upwards. Plowing is one of the most effective means for conserving the soil moisture that is stored below the furrow slice; it puts the soil into a condition favorable to the absorption of heavy rains as they fall; it kills the weeds, and makes the planting of seeds at a uniform depth possible. When plowing is well done the earth is all removed at the same depth and the soil inverted in a loose and open condition. The evaporation is almost completely stopped, but if the plow takes too wide a furrow, or if an improperly adjusted disk plow is used, alternate ridges and trenches are left. These ridges, because they are not covered with a sufficient depth of loose soil, are favorable to the rapid evaporation of moisture from below, and result also in an uneven depth of the seed bed.

Deep plowing in the heavier soils gives greater room for root growth and development, and increases the capacity of the soil for absorbing and retaining moisture. The black, waxy lands of this State are not easily penetrated by the rains and a large part of the rainfall is lost through surface washing. One way to check this loss is to make the land more open and porous by deep plowing, or by plowing and subsoiling.

The first effect of the plowing upon the moisture content of the soil is to dry it out to the depth to which the soil has been disturbed. It is for this reason that when plowing immediately precedes planting, that a poor germination of seed so often results. It is dangerous to plow the land deep when the plowing is to be immediately followed by planting unless special pains are taken to pack the under surface of the soil so as to re-establish capillarity between it and the subsoil. This is why the subsoil packer used in the "Campbell System" has become famous. But when the land is to be fall plowed and is not to be planted until spring I do not believe the use of the subsoil packer would be a benefit for the re-establishment of soil capillarity is not essential until planting time arrives. The rains and harrowings through the winter are usually sufficient to accomplish this result.

It is usual for fall plowed land to contain a greater amount of moisture at planting time than spring plowed land because it has had an opportunity to absorb the winter rains and does not lose its moisture so rapidly in the spring through evaporation. King, the noted soil physicist of Wisconsin, has found a difference of 2.3 per cent more water in the fall plowed than in the spring plowed land, other conditions being the same. There are seasons when there are only light winter rains, when the fall plowing does not show an advantage over spring plowing.

MANURING.

Coarse barnyard manure added to the soil increases the fertility, adds humus and improves the mechanical condition. Many farmers add manure thinking onlyof the increased fertility, but it has other uses. It is well known that an addition of humus increases the water absorbing and water holding capacity of the soil and acts as a mulch checking the evaporation of the moisture from the soil beneath. It will be hard for many farmers to reconcile these statements with their own experience. They have read these things in the agricultural papers and in the agricultural bulletins, and wanting to do the right thing, have manured their land heavily, only to find that many of their seeds do not germinate from lack of moisture, and the few plants that do come up die out from drouth. Why do not their experiences in this agree with the theories advanced by the agricultural scientists who teach that the addition of manure increases the water content of the soil? The explanation for this discrepancy is not hard to understand. You add manure to the soil and you increase its

water holding and water absorbing capacity and you create a mulch that helps to hold water in the subsoil beneath, but the upper six inches of the soil you make very light and open and porous so that you lose its moisture through evaporation. It has become a part of the mulch that is keeping the moisture in below. Now if a heavy rain does not fall this upper six inches of soil is left dryer than before. Soil in this condition needs a rain and a packing down before planting in order that capillarity may again be established between it and the subsoil. Early manuring is about as essential as early plowing and for the same reason.

WINTER TILLAGE.

In this State where there are many winter rains and where the soil does not freeze, a great amount of moisture may be lost between fall and spring through evaporation unless effective means are taken to check it. The usual method to check evaporation is to till the surface with a harrow or cultivator after each rain. Surface tillage is a trap for the rain. You plow and cultivate the soil, making it loose and open so that the rain easily enters, and when the rain does come you harrow the surface, covering it with a blanket of dust so that the water can not get away again.

Winter harrowing after rains may seem to be a very expensive operation but in the semi-arid regions it makes the difference between success and failure. It is the way to store up moisture for the coming crops.

PLANTING.

In planting corn there are two methods in general use: (1) drilling in rows so that it can be cultivated in one direction, and (2) check-rowing so that it can be cultivated at right angles in two directions. Where the ground is clean and where there is not likely to be a lack of rainfall the first method, drilling, may be used to advantage. But where the ground is weedy, or where there is likely to be a lack of rainfall, better results can be obtained by check-rowing. Hand hoeing is an expensive operation and can not compete economically with horse labor.

Check-rowing has the advantage over drilling of conserving more of the soil moisture. In drilled corn the land between the hills in the rows is never cultivated with the result that evaporation over this surface is not retarded. More moisture can be conserved by cultivation in the check-rowed than in the drilled corn. The disadvantage of check-rowing is that special machinery and more labor is required for planting. Whether or not this disadvantage is more than compensated by the benefits will have to be determined by experiment under the various climatic conditions that exist in the different sections of the State. I feel sure that check-rowing will prove to be the better method wherever there is not an abundance of rainfall.

CULTIVATION.

As soon as the corn is planted it should be given a harrowing to firm the soil over the seeds, and to kill any small weeds that may have germinated. The harrow is the most economical kind of cultivator for killing weeds at the time of planting and while the corn is young. When a good stand is secured the harrow can be used on the corn until it is from four to six inches high. It has the advantage of the cultivator in that it stirs every inch of the soil, making a perfect mulch. I believe in early and frequent cultivation of the young corn. The kind of a cultivator to use is one that will stir the soil most nearly to a uniform depth, not leaving it in alternate ridges and trenches. Large shovels on a cultivator are undesirable in two ways: they prune the roots of the corn and they leave unstirred ridges from which there is rapid evaporation of moisture. King has found that this ridging of the land may increase the evaporation more than 5 per cent.

It is now almost the universal practice among the best farmers to cultivate shallow, but there is a possibility that the cultivation may be too shallow for the best results. Aside from the killing of weeds we cultivate to conserve moisture.

In a field after a rain, if there is no cultivation, the evaporation is very rapid.

If the soil is cultivated one inch deep evaporation is checked to a considerable extent, but if it is cultivated 3 inches deep it is checked to a still greater degree. Cultivation 3 inches deep makes a more effective mulch than cultivation one inch deep.

At the San Antonio Experiment Farm we found that the soil not mulched lost 2.1 per cent more moisture in 11 days than that cultivated 3 inches deep, and the soil mulched one inch deep lost 1.2 per cent more moisture than that cultivated three inches deep. These experiments show very clearly that a mulch one inch deep is not as effective as one, two or three inches deep.

While the corn is young, then, I should cultivate three inches deep, but after the roots have made a strong development it no longer is safe to go deeper than one inch for the roots fill every inch of the space between the rows and come close to the surface. Root pruning of corn in cultivating is injurious.

I have some figures here of soil moisture analyses that show strikingly why corn or any crop should be cultivated as soon as it is possible to get on the ground after a rain. Rains destroy our soil mulch, so that as soon as the clouds clear away rapid evaporation begins at the surface and the water in the soil below moves up to take its place. (Note in the tables how the rains almost invariably leave the third foot dryer than before.)

The tables show the moisture content of the soil on June 27 and July 5. On July 2nd we had a rain of 1.52 inches. It should have raised the moisture content of the first three feet 3.4 per cent. Instead of doing this, however, there was an actual loss of moisture in both orchards and only a very slight increase in the moisture content of the other fields.

PASTURE LAND.

Depth in feet.	Per cent. moisture June 27.	Per cent. moisture July 5.
1	7.9	13.5
2	11.5	11.9
3	11.7	11.1
Average	10.4	12.2

In the pasture this rain increased the moisture content of the first three feet from 10.4 per cent to 12.2 per cent. If no moisture had been lost through evaporation it would have been increased to 13.8 per cent instead of 12.2 per cent. The moisture in the first foot increased from 7.9 per cent to 13.5 per cent. The second foot remained practically the same while the third foot actually lost moisture.

SORGHUM.

Depth in feet.	Per cent. moisture June 27.	Per cent. moisture July 5.
1	11.1	16.1
2	12.5	10.3
3	12.6	11.5
Average	12.1	12.6

In the sorghum there was an average gain of from 12.1 per cent to 12.6 per cent. Had no moisture been lost it would have averaged 15.5 per cent. The first foot increase from 11.1 per cent to 16.1 per cent. There was a decrease in both the second and third feet.

Exactly the same kind of a movement occurred in the millet, the corn, and the two orchards as shown in the tables below.

MILLET.

Depth in feet.	Per cent. moisture June 27.	Per cent. moisture July 5.
1	7.9	12.0
2	8.7	8.3
3	9.1	6.9
Average	8.6	9.1

CORN.

	Depth in feet.	Per cent. moisture May 28.	Per cent. moisture June 6.
	1	17.7	21.2
	2	19.6	19.1
	3	15.7	15.7
Average		17.7	18.7

ORCHARD.

	Depth in feet.	Per cent. moisture May 28.	Per cent. moisture June 6.
	1	22.3	22.2
	2	21.2	21.2
	3	19.6	17.8
Average		21.0	20.4

ORCHARD.

	Depth in feet.	Per cent. moisture June 27.	Per cent. moisture July 5.
	1	20.8	22.8
	2	22.1	19.5
	3	20.6	18.1
Average		21.2	20.1

From a study of these tables we find that when the surface of the ground is made wet without enough water to cause a downward percolation there at once commences an upward capillary movement of the moisture from the soil below. If this movement is not at once checked, there results a great loss by evaporation.

Because of this upward movement of the water from the lower layers of soil after a light rain the corn or other crop may be greatly refreshed but in doing so the total amount of available soil moisture is greatly reduced, and in a few days the soil is left much dryer than before the rains.

Light rains that destroy the soil mulch are decidedly harmful, and the heavier rains to be of the greatest benefit must be followed as soon as possible by harrow or cultivator.

Question: At what station would you advise to stop working the corn?

Mr. Headley: I have not determined by any experiments, but I think it is a good idea to stop cultivating after it is through "bunching." You might go through it a couple of times with a one-horse cultivator, but if we have no late rains that is not necessary.

Question: Do I understand you to say that after every rain it will benefit the corn to use the harrow?

Mr. Headley: I have not experimented very much on that point, but it is not necessary after the corn is silking.

Question: Is there no danger of getting the soil plowed too much?

Mr. Headley: Not if it is plowed deep enough.

Question: When should we use the harrow?

Mr. Headley: Use the harrow during the winter after heavy rains. That is, in the dry regions.

Question: What could we use on the cultivator in the place of the large shovel?

Mr. Headley: Use more shovels. Instead of using four shovels use six or eight or even ten. That idea was covered in the diverse cultivator scheme.

Mr. Dorsey: When should manure be put on the ground?

Mr. Headley: Before breaking it.

Mr. Pawledge: How deep did you say we should cultivate?

Mr. Headley: While the corn is young it is safe to cultivate three inches deep, but after it gets larger it is dangerous to cultivate very deep.

WHY WE GROW GRAIN IN TEXAS.

A. M. FERGUSON, Sherman.

In total production of grain, Texas takes high rank, but in yields per acre she stands considerably below the average of her sister States. Her large grain yield is due to the large acreage of grain crops. It is not generally known that more than half of the cultivated land in Texas is in grain. Texas grows corn, oats, wheat, barley, rye, rice, Kaffir corn, milo maize, millet, emmer, and others in small degree. The purpose of this meeting here today is to discuss some of the factors of progress in grain growing applicable to Texas conditions. Before taking up this special problem, I want to offer a few words on Texas as a grain growing State, and why she will remain so.

To begin with, we need the grains for our dining tables and feed troughs. The grains form a cheap, healthful and nutritious diet for man and beast in all countries.

Secondly, we can produce them cheaper than they can be imported from the North. Corn can be produced in Texas for from 12 to 25 cents a bushel. It can not be shipped in from even Oklahoma or Kansas for less than 50 or 60 cents a bushel.

Thirdly, we are going to continue growing grain because it is a physical impossibility to put all our land in cotton, even if we wanted to. The bulk of the labor with cotton comes in two short seasons. An all cotton crop would leave us in comparative idleness for the other two seasons. We must grow other crops to keep us busy throughout the year. We must diversify in order to distribute our labor.

It would be useless to say anything about our opportunities to export corn, when we are not producing enough for our own use. I want to remark in passing, however, that Kansas, Iowa, and Nebraska farmers are shipping corn clear across the State of Texas to the port of Galveston and paying a freight bill of from 30 to 37 cents, when Texas farmers can put corn into the same port for not exceeding 12½ cents. When we get to exporting corn, instead of importing, it will be nice to have an advantage of from 18 to 25 cents.

It was just stated that Texas does not produce enough grain for her own use. The Secretary of the Texas Grain Dealers' Association puts the imports, nine years out of ten, for corn alone at 25,000,000 to 50,000,000 bushels, all of which is paid for with cotton money. Add to this the bill for corn-fed hogs, for oats, for wheat for our mills, and for other grains, all paid for with cotton money!

We boast that Texas produces one-third of the cotton crop; that cotton is the great crop that brings money into Texas. We export lots of cotton. We import 200 bushels of grain to every bushel we export, but let us not forget that our failure to grow enough grain "to do," as we say, takes more than a fourth of the cotton money out of Texas.

No student of Southern farm economics would suggest that we abandon cotton, but I do contend that the man who tills the soil will be better off, year in and year out, if cotton is reduced strictly to a "surplus money crop," and that grains, hays, in combination with stock be made the mainstay of the farm.

Let me again say that we should not want to be a one-crop country. The all cotton sections of the South and the tobacco sections of the middle States are noted for their backwardness in the usual factors of progress. Now listen to me. I am a Texan by birth and by ancestry and have a right to talk about Southern conditions so long as I keep within the facts. No one loves Texas more than I do. I have seen enough of Texas to know a good range when I see it. I have a passing acquaintance with the country to the north of us.

In many of the Northern States grain and hay compose 90 per cent of the products of the fields, though not of the marketable products of the farm. Study these facts. These States spend more money for farm houses than we do: more money for barns; more money for draft and breeding stock; more money for tools; and too, more money for buggies and "Sunday-go-to-meetin'" clothes. All these things in a grain growing country.

Still more significant, they spend more money per capita for schools, for churches, for public roads and forty other things that make a people contented and happy than we do in Texas. All this with about 90 per cent of their fields in grain crops, that must be sown, cultivated and harvested within a short growing season. And I hear you ask, "All these nice things from grain alone?" No! I am not talking about a one-crop people. Every farm is an up-to-date manufactory, turning the bulky grains and fodders into lighter, but more valuable products like beef and pork for Texas cotton farmers, mutton, milk, butter, poultry, eggs,—yes, a diversified agriculture with grain for a foundation.

I am going wild of the topic assigned me by the committee, but I crave their indulgence. We were to talk to you about corn, and to organize a corn demonstration school. Successful crop growing requires close study. Not study of how to keep out of the hard work, but how to make the hard work pay. It is the little details that count. The preparation of the soil, cultivating, harvesting, storage and marketing, are all problems, but in the work today we shall give particular attention to the seed problem.

From seed until seed comes again is a long story. Before we begin a study of the technical features that characterize good grains and grain producing plants, I want to suggest, and with emphasis, that there are a lot of poor seed planted in Texas every year. There is a story after every man's poor results. You know when a fellow makes a poor showing he tells you about it afterwards. There is also a story in front of the good results. If a man gets anything really good, nine times out of ten he has gone after it. So it is with crops. One thing to consider carefully beforehand is the seed.

It is plain that we are to continue growing corn in Texas, even more than heretofore. In this connection let me suggest that we deliberate on this question: "Shall we attempt to meet the increased demand by increased acreage, or by increased attention to the seed and tillage of the current acreage?"

The question of tillage has been frequently discussed in the sessions of the Texas Corn Growers' Association, ending each time with this general conclusion: That from the standpoint of economy the current practices should be revised, and that from the standpoint of profitable results, that in cultivating we begin too late and stop too soon.

The "Corn School" planned for you this afternoon will deal with the problems connected with the selection and improvement of the seed. We shall ask your attention to these statements:

1. The most profitable results follow the use of home-grown or native seed.
2. That purity in type or breeding in corn gives the same advantage secured by the same conditions in pure-bred stock.
3. That there are wide differences in the yielding power of the varieties commonly planted in Texas.
4. That all of them are subject to marked improvement by systematic selection and breeding.

SUCCESSFUL CULTIVATION WITHOUT THE PLOW.

J. S. **WINFIELD**, Gatesville.

In answer to the request of the program committee will say I have about ten acres of corn that will make about 40 bushels per acre that was never plowed with a plow. I broke the land in December and harrowed it in January. It was planted in four-foot rows, running east and west. The furrows were opened by a two-horse middle-buster run very deeply. The seed was planted on February 20th with walking planter that dropped every 26 inches. It came up to a good

stand by March 5th. On March 16th, I dragged a log lengthwise that knocked five rows at a time. On March 23rd, I harrowed with a two-horse section harrow, and on April 5th, harrowed with a spring tooth harrow, a diverse cultivator, and again with the same implement on April 25th, May 7th, and May 22nd. I had plenty of roasting ears by June 7th.

Mr. Quicksall: If you will allow me a few minutes I will say that I visited Mr. Winfield's crop several times this season and I tell you, you do not see any kind of burrs going to seed in that corn. That corn is splendid, and yet they made that corn and never stuck a plow in it. The land was well prepared, and when I say well prepared that is what I mean. It was not just scraped off and planted. It was in first-class condition. It was run over with a harrow, twice with a cultivator, and it was all simply done in a short time. That is one of the secrets of good cultivation. As I said, there was no plowing done at all, and yet it has turned out to be splendid cultivation. I would like to hear this question discussed among the farmers.

Question: How long has that land been in cultivation?

Mr. Quicksall: Thirty-five years.

Question: Don't you think if it had been plowed it would have done better than it did?

Mr. Quicksall: No, I do not. There are several reasons why I do not think it would have done better had it been plowed. The principal one of which is this: that corn had the finest roots I have ever seen and if it had been plowed those roots would have been killed. Another thing, it made the ground more level not to plow it.

Mr. Plunkett: A man moved into our county from Illinois, and, of course, the methods up there are different from ours. This is the way he did: He planted his corn and never put a plow in the ground. Broke his land last fall and cultivated it with the diverse cultivator. I visited that patch of corn and it was about as fine as any in that part of the country. Now, right across the field the Green boys had a patch of corn. They would go right down to the roots of the corn and tear them all out. They had a great idea of "laying corn by in May." This corn was laid by and it turned yellow. Now, there was no fertilizer used on either land; the conveniences were the same; the land was just the same; but the result was this: The first man had about 40 or 50 bushels to the acre and the Green boys made 10 bushels and possibly a little more, but not over 15. The difference was in the way the land was cultivated.

Mr. Murphy: A point that has been overlooked is the cultivation with the harrow in preparing a dust mulch that in black land prevents the ground from cracking and drying out. The corn has a better chance to grow because of the moisture that is kept in the ground. You will find in the country where the land dries out a great deal, that the dust mulch is now being adopted to a great extent.

I want to talk a few minutes on the humus in the soil. It is a question of vital importance to corn growers or cotton growers or any other kind of grower. There is not a time, perhaps, there is hardly a year, that we grow corn or cotton in Texas, that we do not have either too much or not enough rainfall, and in order to grow good crops we need uniform rainfall, which, of course, we can not regulate. You can put your land in fine condition by keeping a great deal of humus and you can make a good crop of corn or cotton. There is nothing of more importance in making cotton than to have your land in a high state of cultivation.

Colonel Aaron Coffee asked for permission to address the Corn Growers' Association. On motion he was given five minutes.

RAISING CORN.

AARON COFFEE.

Ladies and Gentlemen of the Texas Corn Growers' Association: It affords me pleasure this morning to talk to you in a practical way for a few minutes. One of the main things that I want to tell you is that tillage is the only manure with the exception of moisture. Without tillage you can not make corn. Although I have but limited time, I want to show you the value this morning of practical corn growing in the black land of Texas. I want to show you why it is that Texas only raise 18 bushels of corn per acre when she ought to raise 37. I want to tell you that we raised last year in the American corn growing section 2,892,000 bushels, but lost 1,100,000 that she could have raised had the ground been properly tilled.

I am one of the corn raisers of Collin county. I am proud I live in Collin county, the Egypt of the North. Now, here is an illustration (holding up an ear of corn). It is an ear of corn raised in Texas by a man who knows how to raise corn. He raises no cotton, but devotes his entire time to corn. Think of a man who has 1000 acres in corn. The green bugs come and eat up wheat and oats, but not corn.

Without tillage he could have done nothing. He prepared his land thoroughly before planting. Never planted at all until his land was thoroughly prepared. I want to tell you that there is a heap in corn. This corn I have in my hand will make in Collin county over and above the little ordinary corn. It is the variety raised by practical corn raisers. A man can make 15 bushels more with that corn than with any other. I want you to understand that this corn was raised by a man who makes it a life study.

Question: How do you plant corn? I mean how far apart?

Col. Coffee: I plant it far apart, making wide rows.

I was telling you about Mr. Watson. He was working on a woman's farm and asked her what to plant. "Plant, Mr. Watson, what you please," is what the woman said to him, and he planted corn. He planted some cotton, but not much. He makes 60 bushels of corn. You can not keep that man down. A man who raises that kind of corn can not be kept down. He will buy that place in about two years. I tell you, too, that if a man doesn't help his tenant he is a back number. Help him to raise corn and hogs for there is good money in that.

COST OF GROWING AN ACRE OF CORN.

J. L. QUICKSALL, Waco.

I have been attending the Farmers' Congress for the past three years, and also a number of farmers' meetings where they have discussed corn growing, seed selection, germination, productive power of various varieties of corn, but have never heard the question of the cost of growing or securing a crop of corn discussed.

As a business proposition, every corn grower should know the cost of making or growing his crop of corn, as well as all other crops grown on the farm. Every other business under the sun is looked after in detail. The cost is first reckoned on, and it is high time the farmers were counting not only the cost of corn, but of all other crops as well. To give you an idea of the cost of growing corn in this State, I will give you a statement of the cost as kept by sixteen farmers situated in twelve different counties, embracing the black lands of Central and North Texas and the sandy loams of Central-West Texas, including nearly all kinds of soils for which Texas is noted. Also quite a variety of conditions, including rainfall, are to be taken into account in the final results on these sixteen different farms or plats referred to. It might be well to say here, that the largest yield was 48 bushels per acre, while the smallest was 20 bushels per acre. The total acreage was 95. The smallest cost was $7.54 per acre, while the highest cost was $12.50 per acre; the average cost per acre being $10.12; the average yield per acre was 32½ bushels, worth at gathering time an average price of 50 cents per bushel, which shows a profit of $6.13 per acre.

It pays to keep books on your crops. Any good business man, it matters not what the extent of his dealings, whether large or small, would certainly keep an expense account, and he can tell you at the end of the year how his various accounts stand. Then why not the farmer? Let us have a "square deal." See to it that the balance comes out on the right side of the ledger. How can you do it unless you count the cost? We farmers are too careless and negligent about these little things. We must reform, and I believe we will, when it is shown that it pays. We must look after the small things. Stop the little leaks and you will have no large losses.

The right kind of farm management will result in successful crops gathered every year. A number of things must be considered in counting the cost of growing corn. First, the soil fertility and how to maintain it; preparation, good seed to plant, proper cultivation, gathering and housing the crop when matured. One of the best ways of improving or keeping up the fertility of the soil is by planting cow peas between the rows of corn. You might say that it will also lessen the cost by increasing the yield and profits of the crop. For the same reason the thorough and good preparation of the soil will also cut down the expense by the increased yield and ease of the various cultivations after planting. If the fields have had good cultivation you can gather and house the crop more cheaply than when the weeds are allowed to grow and become so numerous that it is with some difficulty that corn is gathered.

I will now give you a detailed statement of the cost of an acre of corn:

Cost of cutting stalks	$ 20
Cost of flat breaking, first time	1 00
Cost of harrowing off	15
Cost of furrowing or bedding	50
Cost of harrowing off beds	15
Cost of planting	35
Cost of harrowing off corn	20
Cost of plowing corn four times at 30c	1 20
Cost of hoeing corn two times	75
Cost of gathering and housing corn	1 00
Total primary cost	$ 5 50
Rental value of land	$ 3 25
Seed corn	25
Interest on investment and wear and tear of implements approximated	1 00
Grand total	$10 00

The above is a fair average of the cost of growing an acre of corn in Central Texas. Of course weather conditions might effect this very materially. The best preparation and most systematized management in cultivation will reduce the cost. It has been clearly demonstrated to me by field observation that the most careful systematic or scientific farmer grows his corn with less expense than what might be termed the careless, indifferent one, who pays but little regard to the preparation of the soil, selection of seed, or cultivation.

Brother farmers, I would like to see the day come in this grand State when every farmer, however humble he may be, can point to his corn crib and tell you with some degree of accuracy the cost of every bushel of corn in it. We find by consulting the United States census reports that the average yield of corn per acre in this State for a period of ten years is a fraction over 18 bushels. Mr. Hartley says in one of the Department Bulletins that it is possible to double this yield without any additional cost. Just think of the millions of dollars that would be added to Texas coffers by this increase. It is simply enormous—over 126,000,000 bushels, or $63,000,000. It is almost startling, yet Mr. Hartley, in his bulletin, says it can be done. Then why not count the cost when the possibilities are so great?

Mr. Clark: I would suggest that the gentleman got the rent of his land too cheap. Some pay $4.00 and some pay $5.00, but some get it for $2.50. Of course, I make that statement as an average, but you know some people do not figure the cost of land at all.

Mr. Quicksall: Most land in Texas would bring $5.00 per acre; that is, good land.

SELLING CORN BY GRADE.

H. B. DORSEY, Secretary Texas Grain Dealers' Association, Fort Worth.

Mr. President, Ladies and Gentlemen: The topic assigned me hardly needs any discussion. You take any part of the country and quality is to be desired above anything else. There are very few things that you would take in preference to quality, if you just stop to think a minute. You should not forget that raising the grade of your corn is the same as raising the quality and that in raising the quality, you increase the yield and, therefore, the quantity. As I said before there is hardly any room for discussion on this topic. Only a few years ago the millers of the country undertook to stimulate on the part of the wheat growers the idea of better production of their wheat and raising better grain. Prior to that time a man would bring his wheat and perhaps it was worth 60 cents; if it was, the miller would pay him 60 cents for it. His neighbor would bring in some wheat that was worth from 10 to 15 cents less, but he would get the same price as the man whose wheat was worth 60 cents. However, since the millers adopted the plan of grading the wheat, the farmer has been paid on the merit of his production and, therefore, it was a just measure. In raising the grade of any kind of grain, though, you must look after the soil. In this way you will increase the grain and at the same time enhance the value of your land. It is the same way with oats. For instance, here is a practical man who has taken a good quality of oats, the very best grade he can find; by selecting the grain, he can get from 75 cents to $1, while other people get 50 cents. Now, if you take the pains you can do likewise with your corn. Of course in raising the grade of your grain you benefit humanity as well as your pocketbook. It is the same way with wheat and oats. But when a proposition like that presents itself to most farmers they don't value high enough the little time it would take to go through their field and pluck from that field the best ears of corn.

Let me give you a little illustration. When you walk up to a fruit stand to buy a nickel's worth of apples, you will pick around over them and get the best apples or peaches or any other fruit. You ought to remember that when a man goes to buy corn he will open the sack and look at it and he will go along and after a while decide what is the best corn and buy it. It is the same way with everything. The proposition is too patent for me to take your time to discuss it further.

In Iowa they have a corn campaign. They are profiting to a very great extent, the corn raisers there, by furnishing them seed, etc. It is a matter of State pride. There they don't raise much grain. Their land though is worth $100 and $120 per acre. We have better land here that we don't get but $75 for and only raise 25, 40 or 60 bushels to the acre. This land should be worth more for we can raise every known variety of vegetation in Texas. The seasons provide for it. Therefore, gentlemen, you are treading on your own rights by not increasing the productions of your farms.

CORN GROWING AND STOCK RAISING.

F. R. Marshall, Professor Animal Husbandry, Texas A. and M. College.

The growth of the Corn Growers' Association, in the face of high priced cotton, is the strongest possible evidence that Texas is advancing toward a more stable system of farming.

Although we understand the principles that make live stock an absolute essential to the fertility, maintenance and improvement of soil, we do not very generally apply that principle so well as we will be forced to do within a comparatively few years.

It will probably be most useful to discuss the classes of live stock that the grain or cotton grower may best use, and to talk of that management of farm animals that enables us to secure the greatest net profits from each acre.

It need not even be maintained that all the grain grown upon the farm should always be marketed by feeding to stock. Some of the most careful and successful farmers manage to have some corn to sell when prices are very high, but these successful men work on a long time proposition. It is impossible to be sure of a regular profit if we aim to have stock to sell on high markets this year, and then close out to sell grain next year and get back in the stock the year following. Though perhaps not impossible, it is altogether improbable that any ordinary man could change so often and always be on the winning side. Good stock, well managed, produced from cheaply grown crops is always profitable; perhaps in some peculiar seasons not so profitable as grain selling, but over a period of, say, ten years, the intelligent use of good stock for carrying corn and forage crops to market will bring the greater returns and improve, rather than impoverish the land.

It is frequently claimed that 60-cent corn can not be profitably fed to hogs. If we have in mind the kind of hogs that gain one-half pound per day and sell for 5 cents when others are bringing 6 cents, then it is wiser to sell than to feed corn at 60 cents. As a rule, however, high grain prices result in high prices for market stock, particularly well finished stock, because only a few feeders have the courage to use enough expensive feed to fully finish either hogs or steers. As a result when the grain prices advance large numbers of half finished animals are shipped, the market so oversupplied as to make it unnecessary for the packers to advance prices, while at the same time they are forced to compete with each other to secure the few fancy animals. Courage alone, however, will not do to make a profit from high priced corn. This corn must be put into animals that will sell toward the top of the market, and be combined with other cheap home grown feeds that will secure the largest and cheapest gains.

One chief object of the Corn Growers' Association is to secure large yields of better corn, and enable the grower to get the most from the corn he raises.

The State of Iowa had in June, 1900, one pig for each four acres. I use this fact because in that State corn has always been their chief study, and they have had more experience than most of us have had in the business of turning corn into money. While Iowa had a pig for every four acres, the black land of Texas had a pig for every fifteen acres. Fifty-eight per cent of Iowa farmers derived the principal part of their income from the sale of live stock, selling in 1899 stock to the value of $3.50 for every acre of land in the State. At the same time the black land belt of Texas sold 50 cents worth of stock for each acre.

The work of W. H. Rowe and son of Jacksonville, Ill., is an illustration of the profitable combination of corn and stock growing. Mr. Rowe farms eighty acres and markets on an average 150 pigs per year. Each year thirty-five acres are planted in corn, which has averaged eighty bushels per acre for the last four years. It is my recollection that Mr. Rowe was first a corn breeder and then added stock to help his corn business. It is no unusual thing for him to sell $800 worth of seed corn in a year. Mr. Rupert of another county in the same State sells $15,000 worth of hogs annually from 1200 acres, and estimates his profits from hogs at $6000.

Until Texas produces corn enough to supply the home demand, prices are likely to remain at a point very inviting to the habitual grain seller who is unfamiliar with stock. The increasing acreage of Kaffir corn in new parts of the

State is going to add to the feed supply, and tend to keep Texas feeding corn prices more nearly in line with those of the rest of the country. At the same time it is altogether unlikely that we will ever again have what we used to consider cheap corn. The same conditions which cause future high corn prices also insure meat prices correspondingly high. In Ohio and Illinois the beef animals are giving way to dairy stock. The West and Southwest are furnishing an increasing proportion of the country's pork and beef. There is no good reason for believing that our Texas black lands are going to leap from a system of growing cash crops altogether to one of dairying and intensive scientific farming. The lard hogs, though not nearly so numerous as they should be, are preparing the way for beef cattle. The last two years, Indian Territory corn fed cattle have won the car lot championship at Fort Worth, and on the third of this month an Oklahoma feeder sold three loads of corn fed steers at $6.40 per hundred on the Fort Worth market.

The man who is advanced enough to raise seed corn for which his neighbors will pay an extra price, needs stock with which to keep up his yield of corn, and to keep down the cost of raising by securing sixty bushels from the same land and effort that would otherwise return forty bushels or less.

Careful calculation counts for as much in farming today as in any other business, and in the future will be even more essential. Though the market should offer 50 cents for corn that was produced for 30 cents, the possibility of securing 52 or 55 cents must be debated. This extra amount over market prices for corn can always be secured by using it in proper combinations for feeding, not to ordinary, but superior stock. Unregistered market-topping animals can be handled more profitably than common breeding stock. The high prices are for the breeder who raises something that is an improvement on what the majority possess. Here is what another Illinois farmer gets from a farm, one-half of which is in permanent pasture: $100 per head for all stock sold from a herd of seventy cows, $25 profit per head from a flock of forty-nine ewes, $1200 annual profit from hogs. This is in McLean county, where lands are as high as anywhere in the United States.

The man who sells superior seed corn is the man to whom his customers are going to look for superior breeding stock. Increased attention to corn breeding must create a greater interest in good stock, and when the breeders of common stock are convinced that it is economy for them to pay a good price for a breeding animal, they will turn to those men who have won prominence as breeders of good corn, and the breeders of good corn are logically the breeders of good stock.

THE USE OF GRAIN IN A RATIONAL FARMING SYSTEM.

W. J. SPILLMAN, Washington, D. C.

I did not know until yesterday the topic upon which I was expected to talk. There are, however, a few things I can say which may be worth while. The American farmer has always been an expert in skimming the cream off the soil. One of the most effective ways for removing the cream has been grain; in the South, cotton; in the North, wheat, and in some sections, corn. Wheat ran its course in New York and now it is reduced to its proper position in that section. Formerly it was grown every year on the same land. Many Iowa farmers raised little but wheat until they wore their land out. Then they quit and are now raising corn. Not much improvement. Up in Nebraska they are still raising corn, but in the Dakotas they are raising wheat mostly. A few of the most progressive farmers have adopted different crops, but the majority are still raising wheat.

Now, I am going to take up the three principal grain crops of the country and state their position. First, the oat crop. There are three principal belts in the United States, but the Northern States is where oats is an important crop. Take Michigan and Wisconsin; the usual thing is corn, oats, and clover. In Maine they have the same thing with potatoes instead of corn and the schedule is potatoes, oats, and clover. That is the position of oats there, and it is grown a great deal. In the middle latitudes oats are a failure. In Missouri, Kentucky, Virginia, West Virginia, and parts of Kansas the oat crop does not pay, and a man who tries to grow oats there every year may get a good crop once in three years. In the far South the oat crop does well as a winter crop, sown in October.

Just a few words about the position of the wheat crop. Now when you come to where oats begin to fail that rotation becomes this: corn, oats, wheat, and then comes timothy and clover. The oats do not pay but a good many plant them. This is because wheat can not readily be sown immediately after corn that far north. A little farther south they cut the oats out and we find this modification, which is a good one: corn followed by wheat and this by timothy and clover. When we go further south the rotations go all to pieces. The Southern farmer doesn't use crop rotation. For one reason he doesn't have to. He can plant smething nearly any time of the year. Take Michigan, for instance. There are only two weeks when they can plant corn there and get it matured, while down here there are four, five or even six months when you can plant it.

Now I am going to talk a little about wheat. The average yield in the United States is thirteen bushels of wheat to the acre, which at 75 cents per bushel makes $9.75 per acre. The average wheat grower of the United States would make about as much money if he let his land lie idle and worked for somebody else and got current farm wages. Even when you get twenty bushels to the acre, that, at 70 cents per bushel is $14 per acre. The cost of growing and harvesting is about $9 per acre, which leaves $5 per acre profit. More money can be made from wheat another way. Take a one-horse drill and sow the wheat in your corn field, and then turn hogs in there. The experience of the last two winters on our farm in Missouri indicates that we can get 360 pounds of pork from an acre of wheat in this way. We never harvest the wheat. At 5 cents per pound for pork, that makes $18 per acre for wheat. Now to get that $18 it costs five pecks of wheat and the cost of sowing it. That is the way we use wheat on our farm. The suggestion is worth trying out here in a State where hogs do as well as anywhere.

HAY FARMING DISCUSSED.

Question: Will goobers do as well as wheat?

Answer: The goober does not take the place of the wheat, but let the hogs eat the goobers and then turn them into the wheat field.

Question: Are oats better than wheat?

Answer: It is probable that they are in your section of the country. The point is this: Grow the grain which is the best with you.

Question: At what time do you turn the hogs in?

Answer: About six weeks after the wheat comes up. In the summer time we use clover the same way and feed the hogs all the corn they will eat late in the afternoon. You can keep more hogs on an acre of alfalfa than we can on an acre of clover. On good alfalfa land you can keep from 10 to 15 head of hogs per acre. The clover crop is over with us about the first of November.

Question: If we all went into the hog business, would we overdo it?

Answer: If every man here should do that it would have no effect on the market. Of course, if everybody should go to raising hogs as a leading business it would be overdone. There is this danger, however; you may have to deal with hog cholera. Every farm that touches our farm had hog cholera year before last, but we didn't have any. Why? Lots of people bring cholera to their hogs. They go where the cholera is and bring it back on their feet, and, of course, their hogs take it.

Question: Are you bothered with cockleburs?

Answer: We have lots of them on the place. At the time of the year we turn the hogs in the pasture there are burs. They have been known to kill hogs. They have not given us any trouble, however.

Question: What causes cholera?

Answer: It is caused by a microbe and it comes from another hog. It dates back as far as time, and hogs have always had it.

Question: Can a herd of hogs catch the cholera if there are too many in the pasture?

Answer: No, they have to get it from some other hog or they can catch it from the field where there have been hogs with cholera. Very frequently a man introduces cholera into his herd by buying pigs elsewhere. I did that once. I bought a pig and intended to put it off to itself, but had to leave home, and it was not done. As a result I lost 85 per cent of my hogs by cholera which they caught from this pig. Then again, a hog might come in a car where hogs with cholera have been. That is a good way to get cholera. But the most common way is for men to go to a place where hogs have cholera and get the germs on their shoes, then they come home and bring it to their own hogs. No one is ever allowed to go into the enclosure where our hogs are if any hogs in the community are sick.

Question: What age is the hog and how much has it cost you before you can make that $18?

Answer: He was four weeks old when turned in and cost the feed of his mother for six months; that is, a litter of pigs costs that.

Question: What does he weigh?

Answer: After he is fed about 10 or 12 bushels of corn on this pasture he weighs about 200 pounds.

Question: Do you know of any variety of oats immune to rust?

Answer: No. The Texas Red Rust Proof is probably as nearly immune as any.

Now, one thing more. Regarding the work of the office of farm management. We hunt up farmers who are making money and study their methods and then write them up and publish them. We shall be glad to have you all get these bulletins, which you can do by writing to the Secretary of Agriculture at Washington, D. C.

CORN EXHIBITIONS.

Mr. B. F. Hawkins: I will make a few remarks on how to prepare corn for exhibition. This commences with the preparation of the soil and goes right on through. The very first thing we do when we commence preparing corn for exhibition is to thoroughly cultivate the soil. It takes plenty of good hard sense and lots of energy, and I think that is where we fall down. We give most of our time to cotton when corn, which is the great grain of Texas, needs our attention.

Mr. Ferguson: This question of preparing corn for exhibition is an important one. Mr. McMurray, who was to discuss the educational and business value of corn shows, is unavoidably absent. Let me get in a word along his line before we come to the next topic. They say up in Missouri people have to be shown, and Texas people are the same way. There is lots of good corn in Texas and our corn shows are for the purpose of letting it be seen. When we have a corn show in any place you can see corn there from all parts of the State. The man who is raising poor corn goes home thinking the matter over, and if there is anything that will wake a man up, it is to see the other man doing something. Herein lies the value of corn shows.

The Dallas and San Antonio fairs have increased their premiums and offer more prizes on corn than any other kind of crop. Something like $160 was spent last year at each fair for premiums on corn.

Mr. H. B. Dorsey: I just want to add one word to your remarks. The Lord has done a good deal for Texas corn growers, and if they will help themselves they will greatly profit by it. The Lord put us close to the port of Galveston and gave us some of the finest soil in the world for growing corn. There is nothing to keep us from growing corn if we will. We have ground enough to raise corn for the whole earth, and as I said, we are right here close to Galveston, one of the greatest corn markets of the world.

Mr. A. M. Pyron: The subject assigned me, the best way to exhibit corn or to prepare corn for exhibition, is partly settled by the catalog of our fairs. I want each one of you corn growers to have a catalog. If you are preparing corn for exhibition it is necessary for you to know the best way of preparing it and the premiums that are offered. Now, in one place, the catalog specifies ten ears for an exhibit of corn. You must be sure to have ten ears. Don't have less, for you are liable to be ruled out by the judges. In another place it specifies twenty years. Be sure and have twenty.

Now, for a corn display. You can arrange that to suit yourselves, but I want to say to the corn growers that I think they ought to exhibit this year in our fairs in a corn booth to themselves and have that booth decorated with corn so that it will attract the attention of the public and call attention to the Texas Corn Growers' Association. Now, that is about all of your preparation. I will arrange the balance. I am going to protect your corn in the San Antonio fair by exhibiting on tables covered with gauze wire to prevent people from handling it and shelling off the grains. I will protect the exhibits until they are judged. Then after they are judged I will take the wire off and let the farmers compare one corn with another, but I hope they will not shell it off.

THE PURPOSE AND VALUE OF SCORE CARDS.

C. H. ALVORD, College Station.

You have learned the good points of corn because you have come in contact with it and have learned to appreciate the value of the different points. In picking up corn and looking it over you say "That is a good ear of corn; it has size, uniform rows, small cob, tip that is well covered," etc. If we were all as well educated as the experts are, we would not need score cards, but I regret that we are not. Here comes a man with a little ear of corn to which he has taken a fancy and says, "My corn is just as good as yours." Why? "Because mine is built so and so." Don't you see that he has set up his own standard, and who is going to say who is right and who is wrong? At one fair one man says this hog is entitled to the prize, and at another fair another hog gets the blue ribbon. For this reason the breeders of hogs have found it necessary to establish standards of excellence. It must be the same way with corn. The only way we can arrange any satisfactory comparison between the grades of farm stock or crops is to establish a standard and then work towards that standard.

Take a boy that doesn't know anything about corn and show him an ear. The first thing he is impressed with is the size. He will pick the biggest ear almost every time, no matter about the size of the cob. The boys are not to blame for this. I have seen men go right by some of the finest grown fruit and grain and the finest stock and select some that was exceedingly large and did not belong in that class at all. Some men are only boys grown larger.

Quality enters largely into consideration when judging all classes of farm stock. Quality means most value in the smallest space. It is just the same with an ear of corn as with a steer. The steer that will make the most meat with the least waste is the steer that will bring the highest price in the market. So it is with corn. The corn that will put the highest per cent of feeding material on the ear with the least possible percentage of cob or waste material is the kind to raise. We must take these boys and teach them that the small cob is desirable in corn, but that the small cob must be accompanied by a long kernel and uniform rows. Speaking about the size of the cob. What importance shall we give to that? One man wants small, another large cob. Produce corn with kernels of uniform shape set close together in the row and the rows close together and it doesn't make so very much difference about the size of the cob. In other words this cob is waste matter and the relative ratio between the waste matter and good product on the outside is what we are after. We don't want a cob too large. I have seen corn sometimes where the cob is so large that it never dries out and moulds the kernels; so we must call the attention of the boys to that; also to the shape of the kernels, arrangement in rows, etc. We find that one variety of corn has one arrangement and another another arrangement.

I do not intend to go into the question of seed corn or selection of seed corn, that was not my topic. I want merely to call your attention to the value of the score cards. The value of the score card is in teaching men and boys not familiar with the subject the good points and relative value of the good points on an ear of corn. It is to teach them by the shortest and most direct methods the very things that you know if you are a good judge of corn. Hence, we use the score card and find that it is the best way to call attention to important points. After the boys understand the score card thoroughly then they know exactly how much importance to place upon one point and how much upon another. The ultimate object of this work is the producing and judging of an ear of corn in accordance with the largest amount of valuable material and the smallest percentage of cob.

The same thing appears in the value of the stalk. In other words the size of the stalk is of interest and determines the value of the corn as well as the ear. The stalk below the ear is seldom saved in this State, but left in the field. It takes out the soil moisture and fertility and does no good. So the stalk upon which the corn grows should be judged the same as the ear. A relatively small stalk with a large ear is more to be desired than a large stalk with a small ear; in other words we must learn to grow corn containing a high percentage of feeding material with a small percentage of waste.

The characteristics which make a corn valuable according to the standard should be noted in the score card, and seed corn should be selected and judged according to this standard. The characteristics which distinguish one variety from another, such as color, shape of kernel, number of rows, etc., will be brought out in the score cards for varieties.

PROMOTING THE USEFULNESS OF THE TEXAS CORN GROWERS' ASSOCIATION.

M. B. YEARY, Farmersville.

The methods to be employed, so far as Texas is concerned, are in their infancy, but we can have our ideas and can see the efforts of others. We find that the States known as corn States have used many methods, some with marked success and some not so much.

The corn car or train seems to be very popular and has given some wonderful results in some of the corn States. This, however, was not done by the Corn Growers' Association, but no doubt was influenced by the association. If our association could induce the State authorities to take similar steps it no doubt would be of much help.

If the association could establish a scale of points of a good ear and stalk and simplify them so they could be easily understood and have stalks and ears which would easily represent the marks at our fairs with a well posted man there to explain them, and could advertise the fact so that the farmers and those interested could receive short lectures on this subject, and on questions of breeding, I think it would create considerable interest. Similar information could be run in the daily and country papers. If the names of reliable seed corn growers were placed before the public and in some way guaranteed by the association, the people would buy more seed corn and take more interest in preparation, cultivation and seed selection and cause quite a new interest in corn and the Corn Growers' Association.

One of the reasons for not planting better seed corn and not raising better corn is because the average farmer does not know how to judge a good stalk and has not learned the necessity of good seed. Our seed growers who have lately branched out on that line have taken a very responsible job on their shoulders, one with which they should be very careful. The association should see that a grower of seed corn, known as a member of the association, and a breeder in that association, was offering none but good, sound, well bred and selected seed for sale. And if a breeder should by a bad season not have good seed he should say so and not offer it for sale. The indiscriminate practice of selling anything, whether sound or not, mixed or unmixed and calling it Hickory King, Golden Dent or Iowa Silvermine is a very effectual way of killing the association.

Unless our wholesale seed houses can be induced to have more respect for their business and have the welfare of the country more at heart than have been shown in some instances I think the seed corn of the recognized growers of our association should be kept out of their hands. I have seen seed corn shipped to our country merchants for sale to their customers that had no doubt been scooped into a steam sheller from the crib with no selection at all and not even fanned or screened. To a careful corn grower this is disgusting and to a careless one it is a disappointment and leaves the impression on his mind that one corn is as good as another. The Texas seed corn breeders might do well to have a special package with their name and brand on it and fill them and seal them up, allowing them to be sold only in unbroken packages, so there could be no mistake. Then if the grower would set a retail price or at least a price for the wholesale merchant to sell, and it not to be 100 per cent profit, the standard could be maintained and the public would know whose corn they were buying. The seed grower might not sell as much at first, but the one who took the proper care of his seed would, like a proprietary medicine or other article of commerce and value, receive his reward for his knowledge and trouble and the association might build up its standard and usefulness.

Now that agriculture will be taught in the public schools, if the association could grade the schools and offer prizes to the school, in the way of equipment or something else attractive, there would no doubt be considerable interest manifested. By all means seed corn from seed growers belonging to the association should be fit for planting and should reflect credit to the association and the grower.

SUGGESTIONS FOR ADVANCING THE WORK OF THE TEXAS CORN GROWERS' ASSOCIATION.

Mr. A. M. Ferguson: As you know, every association has to depend somewhat on its secretary and president in these matters. Anything in a few men's minds don't represent Texas. We have cotton and corn in Texas. We also have oats, rice and some eight or ten different kinds of grain. Now, what can be done? I want to suggest one thing for your consideration. It is this: You get a suggestion that will make you think. If Mr. Brown went to your field to talk over corn to you he very likely called your attention to something you had been looking at all the time, but had never seen it. There is a lot of difference between looking and seeing. This idea has occurred to me. The first requirement is the attention of our busy farmers. You know every time we have a fair we have a lot of circuses, etc., and the people go up at the call of the bag-pipes and listen to the fakirs. There are various ways of getting the farmer to listen and of helping him to see the thing he has been looking at all his life. He can we do this? Follow the Iowa plan. Several years ago in Iowa they started a "Corn Gospel Train." They got farmers, professors, charts, coaches, etc., and traveled 10,000 miles in Iowa, stopping at different places and asking the farmers to come and talk over their ideas with them. This work was done largely by the agricultural colleges under the supervision of the business organizations.. Now, is it possible to devise such a thing in Texas? Last year we took up the matter of having a seed train, or corn gospel train, in Texas, but failed to get it, although we were very much encouraged. I am sure we can get it. I think we can get a train that will go over Texas and do much good.

Professor Welborn: Should we not include other topics?

Mr. Ferguson: Sometimes when one of these trains is started out to cover the whole of agriculture they are so shallow in their treatment that you don't quite catch the idea or the point. We don't want anything like that. The proper thing is to take up one or two central ideas and work them out. If the farmer catches the idea of improving his seed he will catch the idea of improving his soil. One will bring out the other. Pick out one point and hang to that, and let the others hang on. If he learns how to improve his cotton seed the first thing you know he will be trying to improve other seeds. If he learns how to improve his cotton so he will get a better crop, the next thing he will be trying to improve his corn. In nearly every case those who have conducted these trains have insisted that there should be only one or two topics. We should have to judge very largely what these topics should be by the number of people who are interested.

There is another promising field for the association to do splendid work. In the St. Louis fair the boys of Illinois had 8,000 exhibits of corn. In the Dallas fair last year I think we had thirty or forty, and I understand we did not have a respectable exhibit in San Antonio. The school boys in Illinois beat us. In Missouri this year they have 5,000 boys testing corn. That means that every farmer is sitting up and taking notice of what his boy is doing. The boy is educating his father, so to speak. Don't just talk, but get the people together and talk so as to get them interested. Don't let it all go off in hot air.

Now, when you go home talk the matter over, and if you have a suggestion to make, write to me or Mr. McGalliard or other members about it.

Mr. F. K. McGinnis: I have thought about what Mr. Ferguson has said and I want to emphasize it a little. Most of us have heard of the good these trains have done in the Northern States. It has done a lot of good by increasing the interest of the people, not only the older folks but the boys and girls. We can do the same, but those people up there are all interested in the work, and down here there are only a few of us interested. I am sure the railroads, and especially the Texas Midland, will be willing to do their part in the work.

Mr. Pawledge: I want to say there is a man up here who can sing like a bird and talk like everything. When he wants to sell anything he will sing a little bit, and talk a little bit, and the farmers will fall over each other in order to buy what he has to sell. If we want to have the farmers fall over each other we will have to get them interested. I live in Central Texas and there are four of us here from my county who got so interested in the Corn Growers' Association that we joined. If we could have gotten the officers of the Texas Central Railroad to have given us a little cut we could have had a lot of men here. I have been here two times and I would not take anything for what I have learned during this meeting. If I am interested in anything in Texas it is corn, produce, and children. We older folks must become interested. We have boys in our county who went to school here at the A. and M. and they are all holding good positions. If I had been in Texas ten or fifteen years ago I would have had a boy here myself, even if I had had to dig the price out of the ground of my farm. I am going to educate my boys and girls. My girl is now in a normal and my boy will be here next year. Unfortunately, Abe Lincoln's crowd kept me out of an education, but they will not keep my children from getting an education.

Mr. Namce: Speaking of that missionary work. That is a great idea and will do much good. In the seed corn train I think we have an immense job, but one that is of great value. Go all over Texas and see the people and call their attention to the work of the Corn Growers' Association and get them interested, and then instead of numbering our members by the hundreds we will number them by the thousands. Many of the people of Texas have hardly heard of the Corn Growers' Association. Some don't read the papers much, and a large portion stay at home. Consequently they don't know what is going on. First, we must get those people interested in the work that we propose to do, and I think if we can do that we can swell the membership list to a great extent.

Mr. John Gorham: I have a boy who has been going to school two or three years. He started there just before the question of agriculture was brought up in our city schools. One man said that he wanted his boy to learn grammar and not cabbage. I told him my boy was of the age to go into the cabbage class and not the grammar class. The boy is taking a great interest in the gardens. The stuff is raised and worked beautifully and looks thrifty. The result has been with my boy I have had to make him a garden, or rather he has made him a garden. Also he fills me with a lot of questions I can not answer. He applies the knowledge he has gotten in school to his little garden and it is looking fine. Give the boys and girls a little garden for their own and let them work it and attend to it.

Question: Did it interfere with his grammar?

Mr. Gorham: It made a better boy out of him and a better student.

CORN INSECTS.

A. H. CONRADI, A. and M. College.

This subject has been discussed at the last three meetings of this association. At two meetings those insects that injure stored grains were considered, while at another we discussed the corn insects in general. We must admit that little progress has been made in the study of the corn insects owing to the tremendous outbreak of the green bug, which demanded all our attention.

A large number of letters are received during the year in which citizens inquire about the fungus diseases against the chinch bug and grasshoppers so destructive to corn in the field.

The first experiment with the South African fungus against grasshoppers that was performed in this country was that of Professor Morgan, formerly entomologist of the Louisiana Experiment Station at Baton Rouge. This fungus, which had been previously found to destroy large numbers of grasshoppers in South Africa, was tested by Professor Morgan in Louisiana in 1900. He reported as follows:

"The weather was favorable, rains being frequent. Early in August it was found that over the areas where the liquid infection was spread diseased hoppers were abundant. As many as a dozen dead grasshoppers could be found upon a single plant, and some on nearly every weed on ditch banks where the grasshoppers were numerous. From the centers of infection great areas had become inoculated, spreading even beyond the plantations first infected."

In this case only the common differential grasshopper was infected. It was also reported having done effective work in Colorado.

Regarding this fungus disease in Texas we have the following conclusion based on experiments that were repeated several seasons:

The greatest number of grasshoppers appeared during dry weather in spring. Where the atmosphere was moist the effect of the fungus was noticeable, but it has been an absolute failure in dry weather when most needed.

The safest procedure on Texas plantations is in the use of poisons intelligently applied. London purple is often used, and in various instances complaints reached us that the purple killed the weeds and forced the grasshoppers to migrate. Paris green has therefore been recommended with good results. This insecticide can be applied with safety so far as the killing of plants is concerned. London purple is of less stable chemical composition, and the results can not be foretold as safely as in the case of Paris green, whereas both poisons are equally destructive to gnawing insects. London purple, as is well known, is much cheaper than Paris green. In a few cases arsenate of lead is applied. It should be stated that arsenate of lead is an expensive poison, and in comparing these three staple insecticides we get the following:

Paris Green—Advantages: Uniform composition; acts quickly; available on Texas markets. Disadvantages: More expensive than London purple; does not adhere well during rains.

London Purple—Advantages: Acts quickly; cheaper than Paris green. Disadvantages: Uncertain effects on foliage; variable composition; does not adhere well during rain.

Arsenate of Lead—Advahtages: Adheres better; is conspicuous on foliage; absolutely safe to use on vegetation; suspends well in water. Disadvantages: More expensive; acts slower.

The use of the Muscardine fungus against the chinchbug has never been generally recommended. No doubt this fungus works with effect in favorable weather conditions, but in our Texas work we have failed to succeed owing to the preponderance of chinchbugs during dry weather. We have no natural methods of controlling the pests that are of value under Texas conditions. Circulars describing the methods now employed may be obtained at the Department of Entomology upon application.

There are several insects affecting corn that require considerable study in this State before any practical means for controlling them can be recommended. Good examples are the Southern corn root worm and the corn ear worm. Another species doing damage last spring is the smaller corn root borer. The corn bill bugs are held responsible by farmers for considerable injury, which, I think, however, was caused by other species.

It is hoped that during the next season when our greenbug experiments are well on the way that we can continue our work on corn insects and trust that we will be able to work out remedial measures of great practical importance for this association.

Corn ear worms can not be successfully controlled as yet. The chief fact to be borne in mind for the present is that the corn in silk is the most favorable food for this insect. When the corn becomes hard the pest migrates to cotton and becomes the cotton boll worm. The last brood of worms of the season do not enter the soil in corn fields to pass the winter, but they hibernate in the ground in and about cotton fields in the pupa stage. These pupæ are very sensitive to any disturbance and when cotton lands are plowed or disked during late fall, winter and early spring a great number of corn ear worms are prevented the next season.

FALL VS. SPRING OATS.

J. W. MICKLE, Chilton.

The oat crop is one peculiarly adapted to our Texas soil and climate. I know of no other important crop that has been more neglected or elicited less earnest thought and care in preparation and management than the Texas oat crop; and yet success to a more or less extent has been the experience of every oat grower.

Fall oats, or spring oats which, is a question which will suggest itself only to the inexperienced Texas farmer. The advantages of fall over spring oats are many and somewhat varied according to season and locality. With a reasonable winter season, fall oats will not only afford a good winter pasture but will almost insure a splendid crop of grain at a time when a green pasture crop is in best demand; while with a dry, early spring, which is often the case, spring oats would not be much better than a failure.

Many farmers exercise great care in selecting for planting the best corn or cotton seed obtainable, but when it comes to oat sowing they use most any kind and sow them just any old way and in any old place that is not fit for anything else, and if a short crop ensues they say there is nothing in oats, and the next season put everything in cotton. Successful oat growing is like every other crop and demands the same care and thought. It is very important to secure the best for seed, and to have the soil well prepared, and in order to secure them against a possible freeze-out in winter sow early, from the first to last days in October, according to season.

Sow them thin, say from one and one-quarter to two bushels per acre. This gives room to spread and will make a better stand, a larger head and heavy grain and is also much more secure against drouth. I have obtained best results from one and one-fourth bushels per acre, sown early on black land. Some of the best crops realized in this State come from what is termed volunteer oats where a good stand is secured. This volunteer crop is secured by letting the grain get well matured before cutting. The earliest heads, being the ripest, shatter off thus seeding the land for the next crop. By turning the stubble in summer the seed will germinate from the early fall rains and they produce an early and most excellent crop.

I have observed land that for quite a series of years produced fine crops of oats, seeded only in this way, which is one of the easiest if not the best ways of securing a splendid early maturing variety of seed oats.

To summarize my ideas, based on a somewhat limited experience confined chiefly to Central and Southwest Texas with fall and spring oats, I think conditions decidedly favor the fall sown oats.

1. Do not have to sow much seed per acre.
2. Will resist cold and drouth better.
3. The seeding is done at a time when the season is most apt to give a more perfect stand.
4. Will mature before being so much subjected to insects, rust and drouth.
5. Will mature better heads and heavier grains.

6. Will secure the best early market price, and last but not least will afford a splendid pasture in winter which in itself is more than sufficient to cover the cost of the crop. It will keep your hogs in a thriving condition, will keep your colts growing, will open up before your door a most beautiful landscape waving its verdure of green amidst the bleak of winter's desolate surroundings, will give happiness to old "Pide" and "Brindle," who will give in return the richest, sweetest milk out of which is extracted those golden bricks of pure butter, which it is the pride and joy of every housewife to produce, husbands to relish, on which is reared the finest, cutest, prettiest, healthiest, pink-cheeked, curly-headed children, which only an alfalfa king or an oat grower can produce. By all means don't fail to plant a patch of fall oats.

SMALL GRAIN IN SOUTHWEST TEXAS.

ALFRED TOEPPERWEIN, Bulverde.

Most small grain grown in Southwest Texas is grown in the counties of Bexar, Kendall, Medina, Kerr, Gillespie, Blanco and Comal. In these seven counties we can find as great a difference in soil as we can find in the State of Texas. With oats, wheat, rye and other small grain it is the same as with corn, cotton or anything else, different soils must be cultivated in different ways, but the open secret of it all is simply early and thorough cultivation and the use of good seed properly sown. I believe that we can successfully grow small grain on all lands in West Texas except on the waxy, hog-wallow, mesquite lands where oats grow too rank, but I believe that macaroni wheat would do very well on such lands.

The growing of small grain has been very much neglected by a majority of the farmers. If they see they are going to be short on help, they roughly plow the land or in some instances go over it once with a disc harrow and put in the seed, then when the thrasher comes they are surprised that they thrash 15 to 25 bushels less to the acre than their neighbor who cultivated thoroughly before planting.

It is an established fact that the fall sown oats nine times out of ten do better than spring oats, but we can not say the same of wheat as that must be sown according to variety. Some must be sown in the earlier part of October, and the Nicaragua wheat should not be sown before the latter part of December.

Many farmers in Southwest Texas are in the habit of putting stock on their oat and wheat patches in winter. They graze it down to the ground even in wet weather and then, if we have not an exceptionally wet spring, of course their grain crop is short. To graze your grain fields and expect a full crop of grain is just as poor judgment as to plant your corn patch full of pumpkins and try to raise a full crop of corn.

Where do we get our seed? How do we select it? When planting time comes the farmer goes to the granary, takes the scoop and fills his sacks and sows the seed the way it came from the thrasher year after year, thereby sowing the poor grain as well as the good. Where would we land if we would take our seed corn just the way it comes out of the sheller and plant it year after year?

What we need most of all is purer and better seeds, and the question for us to solve is how can we get them?

CHANCES FOR A RECURRENCE OF THE GREEN BUG.

PROF. A. H. CONRADI, College Station.

This species of insect produces its young alive without intervention of a male form. A single individual can attain its growth and begin to reproduce in six to eight days time from the time of its birth. In favorable weather it can reproduce at the rate of ten young per day for a period of twelve days. After giving birth from one hundred to one hundred and twenty-five the individual loses its vitality and dies. The green bug is gradually checked in its ascendancy and finally subjected through certain periods of time by its parasitical and predatory enemies. Whenever the former becomes abundant it furnishes an easy existence for its enemies which multiply rapidly and increase in number to such an extent that green bug food material depreciates in quantity to a minimum. Consequently the predaceous and parasitical enemies disperse and die for want of food material. This period is the interregnum when no green bugs are noticed by the farmer, and it generally lasts from five to seven years. On account of the scarcity of food material, the enemies spoken of become almost extinct. Meantime the few sporadic green bugs which have by flight and seclusion escaped the depredations of their enemies again begin to flourish and continue so until checked and subjected by the return of its enemies.

As previously stated, the green bug is parthenogenetic, i. e., it produces its young alive without the intervention of a male. By comparing with other similar known species we conclude that at some season of the year males do originate, also true females which after the intervention of males deposit eggs which carries the species through an unfavorable time for its other named method of reproduction. This stage is yet unknown, but it appears to be the most practical stage in which to artificially eradicate the pest, and doubtless is the stage into which it goes soon after harvest, and from which it returns to infest wheat and oats.

Parasitic and predaceous enemies of the green bug do not eat vegetation.

They can be present only when they have food material. When this is curtailed they become more or less extinct. In the absence of its enemies when the food material does come it comes so rapidly that it attains a maximum before the former can naturally become numerous to subject it. Warm weather is required for the rapid development of the enemies since they are oviparous in habit, and the eggs can not incubate in cold weather.

Temperature ranging from 30 degrees to 90 degrees does not materially affect the green bug, since it is usually near the ground and well protected by its food plant. If the growth of wheat or oats is pastured short, 30 degrees or less and 90 degrees F. or more will materially affect the insect. When luxuriant wheat or oats is covered with flacculent snow, the insect is not seriously affected. If a cold rain is precipitated violently by aid of wind the green bug is seriously affected. Violent sleet is still more serious to the bug.

It exists for a while on the volunteer grasses which grow in stubble fields and along their borders, but its entire existence during the interval from harvest until the fall growth of wheat is unknown.

In each generation there are about 10 per cent that acquire wings. These are the dispersatory forms which propagate new colonies and thus scatter the infestation in the same and different fields.

While the young insect grows it sheds four skins. This process is called moulting, and the ground beneath large colonies is often covered with these skins or moults.

Indian corn, Kaffir corn and sorghum are not choice food plants for the green bug, and it will not attack these crops unless driven to them by harvest from adjoining field. The loss in this case is only a few rows bordering the infested field. Rye and barley are in general not seriously infested by the green bug, although it does use them as food plants.

Stock do not seem to be affected by the presence of green bug on wheat or oat pasture. On the other hand the green bug is seriously affected by the stock. When the green bug infestation is at its worst, as it now is, it is entirely impracticable to sow oats in infested districts. Alfalfa, cowpeas, cotton and clover are not infested by the green bug and these crops may be raised near or in infested fields.

OUTLOOK FOR A RECURRENCE OF GREEN BUG OUTBREAK.

There has been a great deal of skepticism among the farmers regarding a reappearance of the green bug this fall. Many have expressed a desire to sow wheat if they could have some assurance that the pest wou'd not reappear. In order to obtain data regarding the green bug conditions the writer has personally inspected old wheat and oat fields and adjoining fields in the wheat belt of Texas. All observations indicate that there will not be an outbreak. No green bugs have been found on these inspection trips. This is accounted for by the extreme parasitism early in the season, and by the extreme dry summer we have had. In places in Texas where a few sporadic colonies of green bugs might have escaped the ravages of the parasites, the food material could not have been favorable for the development of these colonies, since they require succulent, tender food material, which is brought about by moist weather.

Furthermore there are other species of aphids which live on perennials that do not easily suffer from lack of frequent rains. The presence of these species has retained some of the inimical insects of the green bug, and possibly if the latter emerges from some unknown places which have been favorable for its development during the summer, it is not probable that its infestation could prove to be serious.

From reports of the Bureau of Entomology the green bug is known to be existing in other localities, but from our observations in Texas we do not believe it exists here at present, except in confinement in the breeding cages of Mr. E. S. Tucker, the field assistant at Plano, Texas, and in our cages here at College Station.

If conditions change at an early date, so that the green bug may for some unknown reason make an appearance, we expect to obtain the information and make it known. On the other hand we ask any one that if aphids are found which appear to be the green bug, to please send specimens of them to State Entomologist's office for their identification and for general information.

DISCUSSION OF THE JOHNSON GRASS PROBLEM.

J. S. CATES, United States Department of Agriculture.

I shall not in this discussion outline a specific plan and describe in detail methods for killing Johnson grass. I shall rather discuss in a broad way the growth of this plant and call your attention to the very great variations in its habits and in its vitality, consequent upon these habits. For upon this variation in vitality we must base our methods of procedure in making the fight if we wish to be successful and at the same time economical. The Johnson grass problem is not so much how to kill the grass as how to kill it with the least possible cost.

Johnson grass belongs to the root stock family of plants. The under-ground stems are not true roots, inasmuch as they do not absorb material from the soil; they are rather a storehouse of material absorbed by the true roots. This material absorbed by the roots proper is first carried up to the leaves and above-ground parts of the plant and there it is combined with the gases of the air and then stored in the under-ground stems for the future use of the plant.

Of course you well know its seed-making habits and you well know also that every joint of these under-ground stems is capable of germinating much like a seed. In our studies we have found none of the stems remaining over alive in the ground after the second year; that is, stems are matured one year and the next year they germinate and then rot away.

We classify these stems as follows: Primaries, secondaries, and tertiaries. The primaries comprise all the old stems alive in the ground at the beginning of the growing period in the spring. (Secondaries and tertiaries become primaries the next year after their formation.)

Secondaries.—When the primary stems germinate in the spring, they send up new stems reaching more or less directly towards the surface. These stems are called secondaries. These shoots coming towards the surface are jointed and the joints are capable of germinating just the same as is the old stem from which they spring. When these secondary stems reach the surface, above-ground plants are formed. There is considerable time here then, during which we have only the primary and secondary stems. During the latter part of this period the old primary stem has all been absorbed and rotted away, provided it is not large. Just before the plant starts to make seed or bloom, the third classification appears.

Tertiary Stems.—These new stems are started from the base of the crown about the time the plant blooms and are called tertiary stems. Their general direction is downward and they sometimes bore down to a depth of four feet, normally from ten to twenty inches, depending upon the character of the soil. It is in these that the plant stores up nutriment for the next year's growth and it is in proportion to the amount of these tertiary stems produced that we have trouble in destroying the plant the following year.

Now I wish to call your attention to the very wide range of variation in the habits of the plant with reference to the formation of these tertiary stems, and consequently its wide variation in vitality. The first picture[1] shown here is a cross section of an old meadow sod. This land was mowed for several years a number of times each year and has not been allowed to mature seed or produce very much top above ground, and consequently it has been struggling all the while to make seed and has not been able to store up material in these tertiary stems. You will notice in the picture that the root stocks are only a few inches under the surface; the grass in this condition could be easily killed by cultivation.

The second picture shows a cross-section of a part of the same field shown in the first picture. The part of the field shown in the second picture, however, was broken deeply in the spring, previous to the taking of this picture in June. This as you well know, is a common method of rejuvenating old Johnson grass hay lands. You will note here a thick mat of secondary root stocks down to the depth of the furrow slice between seven and eight inches. This land would be very difficult to clear of Johnson grass by cultivation.

The next picture shows a cross-section of the soil in a Johnson grass infested cotton field. The stems are shown here to a depth of over twenty inches. This land had been cultivated from the early part of the growing season and afterwards the grass grew up, matured seed and at the same time sent down these long tertiary stems to cause trouble for another year.

The fourth picture shows part of the field shown in the third picture; this part of the field, however, has been pastured closely for one year. In this time the old root stocks have decayed and as the top had been cropped so close, the plant has only produced a small stem and that is only a few inches under the surface. This is all upon which it has to depend for another year.

We have found by experience and by observation that Johnson grass when it has attained a small root stock development, as shown in the old sod land and in the pasture land, if treated properly can be killed with very little additional cost further than regular cultivation. In the picture which I now show you we have an illustration of the relative ease with which Johnson grass can be killed on sod land. The whole field shown in this picture was thickly set to grass, all of which was deep rooted. The worst part of the field was fenced off and the fence line is shown in the division in the central part of the picture. The part fenced off was mown for two years and the latter part of the third was pastured. In the meantime the other part of the picture was cultivated in cotton and corn, an attempt being made all the while to kill the grass. The fence was then removed and the ground all rebedded and harrowed, planted and cultivated alike. After the second cultivation the Johnson grass had disappeared from the pasture and meadow land. This picture shows the appearance of the field in November following; no Johnson grass can be seen on the pasture side, while on the other side there is more grass in evidence than there is cotton.

This is but one illustration. I have found that hundreds of people are unconsciously using this method without knowing the very great difference in the root stock habits of the Johnson grass plant, but we always know a thing better when we know the reason. After inducing this shallow root stock development there are many ways in which the plant can be destroyed. Fallowing in late summer is a very simple method and where there is much cold weather or alternate freezes and thaws, rough plowing in the fall will usually cause the plant to freeze out. Work may be put off until the following spring and after thoroughly breaking and rebreaking the land, we can usually wait until the grass grows up six or eight inches high and has exhausted this small growth of old stems, but has not yet begun to form new ones, and then one or two careful cultivations will kill it out finally.

---

[1] The illustrations referred to by Mr. Cates did not accompany his manuscript. They may be found, however, in Farmers' Bulletin No. 279, of the U. S. Department of Agriculture.

The main point in killing Johnson grass after having introduced this shallow development of root stocks is always to plow very shallow. If we bury the stems deeply the secondary growth, that is the growth connecting the buried stem with the surface, is likely to cause trouble. If we bury the stems very shallow, when they germinate the strength of the buried stem goes almost directly into an above-ground plant. As soon as this above-ground plant has become large enough to take up the substances of the old stem, it can be killed in much the same way as an annual.

Mr. A. M. Ferguson: As you all know, the way to kill Johnson grass has been a live topic all over this State as well as nearly all over the South. One man kills it one way and another tries that way and fails. We have all sorts of plans and ways to kill it. The great value I see in Mr. Cates' work is this: he has given us an understanding of how to go after it. We see one man fail and another succeed by using apparently the same method. That is the value of a man getting a hobby, and we need lots of men who have hobbies on Johnson grass. We want to thank Professor Cates for the information he has given us.

Mr. Murphy: My back yard is fine black land and is about twenty-five feet square, full of Johnson grass. It was up to me to get this grass out because you can't hire it done. You know how we farmers like to get out Johnson grass. Last year I kept it cut down and prevented it going to seed. I cut it before it headed. This year I completely killed it. My success in this was due to the fact that I kept it cut down last summer. Every one asks how to get rid of small patches. I have a few small patches. I am going to hire attendants by the day, and if necessary will pay them $3.00 per day to keep that stuff cut down. I am going to have them cut it down with a scythe and then I am going to have them take a spading fork and spade this up and carry it off in a sack. I am an experienced Johnson grass killer, and am going to follow my method. I have heard about all these other methods that kill and don't kill, and I am going to try the same method that killed the garden patch, and I think I will be successful.

Mr. Cates: This is exactly in line with our method. First, you induced a shallow rootstock development by keeping the plants cut down one season, and the next year were able to kill the grass with little effort.

Professor Welborn: I have been raised in a Johnson grass country and heard that salt would kill it. A barrel of salt was put on an acre of land and didn't kill it. I have watched the Johnson grass business for twenty or twenty-five years. I don't care anything about Johnson grass any more. It makes a fine pasture, and we now like it so well that we don't want to kill it. Without studying the root development we have found from experience that your method of killing it is ours. The meadows should be plowed up and mowed close, and it dies of itself. It makes the land better for corn or cotton. Our negroes work there mostly and they can make a crop whether it has been mowed or not. With mowing it one year and then pasturing it one year it is an easy problem.

A Voice: I never saw two plants grow so well together as alfalfa and Johnson grass. We sow alfalfa seeds in Johnson grass meadow and the alfalfa makes two crops before we see the Johnson grass. Then we have the Johnson grass and the alfalfa doesn't do much in summer, but in winter we have the alfalfa again.

Mr. F. K. McGinnis: We have all kinds of people and all kinds of conditions in Texas. What will do in some parts of Texas will not do in others. I know a patch of about five acres of alfalfa but not a crop has been cut off in several years. Right there, though, the Johnson grass has outgrown the alfalfa every time, and it is good alfalfa land, too.

A Voice: Last year early in the spring we commenced trying the plan of taking up the patches of Johnson grass with the spading fork. That was a little too hard, and so we hunted for an easier method and one that would be satisfactory. We use little cultivators with sweeps and cut off as much as we can of the Johnson grass with these, and it kills it off if we do it about July. We have no trouble whatever in killing out the Johnson grass. The cost for killing it is about $7.00 per acre. There is no difficulty whatever in getting rid of it if you keep it cut off as close to the ground as possible.

Mr. Cates: The great advantage of the method I have outlined is in the saving of cost. By following the method we have just been discussing Johnson grass should be killed with little or no additional cost over that of regular cultivation. This is a matter worthy of serious consideration when compared with the persistent cultivation which you have discussed when you say it costs $7.00 per acre.

IV. TEXAS SWINE BREEDERS' ASSOCIATION.

CARE OF PIGS.

Mr. Crawford: Pigs require very little attention if they are properly housed when the weather is bad, and hardly any attention at all if the weather is good. Let them be quiet; disturb them as little as possible the first five or six days; keep other hogs away from them; keep them in a small lot by themselves with their mother the first week. Feed the mother very little the first few days; after five or six days increase her food gradually, and after the second week give the sow plenty of feed and pasture. After the second week, if the weather is good, it is perfectly safe to let the pigs follow the sow around. During the third week the pigs begin to eat a little; give them slop, corn, and skimmed milk. If you want the pigs to develop rapidly, feed them as soon as they will eat and give them plenty of pasturage and water. See that the pigs don't scour; lessen the sow's feed if they do. Don't feed the same ration continually; provide some variety. When the pigs are eight weeks old is a good time to wean them. I generally have pigs to weigh from forty to sixty pounds in eight weeks.

Question: How do you wean them?

Answer: By separating the pigs from the sow.

Mr. Hestand: In regard to weaning pigs—the pig is young and not used to trouble. I think he should be allowed to run around where he has been accustomed to run, and that the sow should be taken away, allowing her to visit the pigs from three to ten times a day. The pig is used to going to a certain place to feed, to water and to sleep. If you move it off to a strange place, it will squeal and run around the first two or three days and lose more fat than you can put on in a week.

Mr. Sparrsman: Is it better to take away the pigs the first 24 hours or to leave them with their mother?

Mr. McClain: I think that depends a good deal on the sow. If you have a sow that weighs several hundred pounds, it is a pretty good plan to take the pigs away, otherwise it is not likely that you will have any pigs left. A large fat sow, especially in hot weather when she is restless, will crush the pigs by lying down on them and never know it. After the pigs have sucked they should be removed until the sow gets over her restlessness; then they may be put back and left to stay.

Mr. Little: After having lost seven pigs of one litter I examined the next litter and found eight long sharp tusks in their mouths; these I cut off.

Mr. McLain: That is always the first thing on the docket with me; I always take those tusks out before the pigs begin to suck.

Mr. Tom Frazier: The cutting of those little teeth is a very important matter. The pigs fight each other and get sore mouths. They not only do that, but they often bite the sow, causing the sow to jump and in some cases mash the pigs. The time to clip off those tusks is when the pigs are born.

Another important matter is that of the bedding; some men build up a big straw bed or something of that kind; the consequence is that the sow mashes the little pigs which get tangled up in the straw and can't get out of her way. The best thing for bedding is very short straw.

Mr. Davis: I have been breeding hogs for thirteen years and I have yet to cut my first pig's tusk.

MANAGEMENT OF PIGS FOR BREEDERS.

CHARLES B. METCALFE, San Angelo.

The first requisite for proper pigs for breeders is that their sires and dams shall be healthy, mature specimens of a standard breed. Pigs must be born right before it is possible to make good ones, even by the best treatment.

To start them right after they are farrowed the sow must have food that will produce plenty of milk; wheat bran, shorts and alfalfa pasture are the best. She must have plenty of good, pure water and be kept free from lice. My experience is that no one cause is more universal or responsible for more failures of pigs to thrive than lice. Dipping in crude petroleum is a cheap and sure remedy. While pigs are still sucking they should be accustomed to eat some grain, and have all the bran, shorts, milk and succulent green food they will consume.

If given an abundance of these foods at that time they will make more pounds of gain for food consumed than at any other period of life, and it will be good, healthy flesh that will enable them to get about, and not so much fat as to cause them to be sluggish and unhealthy.

I suppose that everyone will agree with me that the best pasture is alfalfa. It makes the sows give milk; the pigs early begin to graze on it, and it will enable growing hogs to assimilate grain and other foods given them. No pasture has been found equal to alfalfa when two plats are used, one to rest and grow while the other is being grazed. If necessary the sows may have their noses ringed to prevent rooting, but the pigs will not hurt the roots. To make the best pigs, let them have their mother's milk as long as she yields it. They will then be large enough to suffer no check when they are weaned. Nothing so hastens the healthy growth of pigs as plenty of good milk from a mature healthy sow. When the pigs are weaned, they must have pasture of some kind to develop into well grown first class animals that will have constitution, size and qualities of quick growth to impart to their offspring. It is possible to raise fat pigs in a pen on corn, but their progeny will not have the qualities of vigor that are most desirable to transmit, and to improve or maintain these qualities which any breed may already possess.

Of course there are many details of various kinds known to special fancy breeders and practiced by them which I do not mention here. The essentials are well-matured, healthy parents, pure water, dry shelter and shade, abundance of good food, entire freedom from lice, and pasture. Pasture is the absolute essential that can not be dispensed with, for young swine must have green food, and the exercise they get means the difference between health and disease, or success and failure in hog raising.

Mr. Geo. Frazier: My practice has been to give the sow every attention up to the time of farrowing and then to be even more particular in the care bestowed upon the sow and pigs. The pigs should be furnished plenty of pasturage and everything that goes with it in order that they may make large, healthy, vigorous pigs. When the pigs are two or three weeks old I make my first selection. When they are nine or ten months old I select again, keeping only those that suit me.

Mr. H. E. Singleton: A good many years ago I thought that the pig intended for slaughter required entirely different treatment to the one intended for a breeder, but I have changed my ideas considerably, and now I believe that the same treatment that will make profitable pork will also make a profitable breeding animal, or I might say nearly the same treatment. I have come to the conclusion that the profitable pork animal is the pig that has been pushed from pighood up until he obtains that weight where he commands the price in market; that is, of course, all things considered. If one is short on feed and feed is expensive it might be better to get rid of the pig earlier.

We are not talking of the production of pork so much as the production of a breeder. The breeder is the one fed protein. We might keep the porker in higher condition than the breeder, but I believe we should keep the breeder up also from pighood.

We can take the razor back (we have done it) and by selecting and feeding produce that type of hog that is pleasing to the eye and have also produced an animal that takes on weight earlier. Of course, the hog of today does not mature any quicker than the razor back, but he gets weight quicker. The old hog or even the improved hog of thirty years ago was a hog that took on flesh slowly, but by this constant feeding and keeping the animal in high flesh, we have created a tendency to lay on flesh. We can't get an animal of any kind that will take on flesh too rapidly. Some say that a breeding animal should not be too fat. I have seen animals at shows so fat that thy were just able to move about and I have seen them make good breeders.

Now what we want in the breeder or the pig that is intended for a breeder is a good growth of bone, muscle, constitution and general development, and I don't believe that can be brought about except by feeding liberally feed that contains protein, and then we want to feed something else in order to keep them in the desired flesh.

Mr. Mouldin: The remarks of Mr. Singleton coincide with my views on this matter. So long as the hog's fat is not a hindrance to it; so long as it can get around it is not too fat. The only difference shown the pig intended for a porker and the pig intended for a breeder is in the finishing treatment. Up to that time the same treatment will answer for both, but the finishing period, just before placing them on the market, is the only time a difference is necessary to be made.

PIGGY'S TROUBLES.

J. U. LAINHART, Bonham.

Piggy's days are few and full of trouble. Born on some cold, rainy night, it stands a good chance of being frozen to death. The owner should know the time of farrowing, and be present to guard against loss. About the next risk piggy runs is being laid down upon by its mother and crippled or killed. This may be prevented to some extent by running a guard rail around the pen several inches from the wall. A desire to push the pig results frequently in overfeeding the sow; in consequence the pigs have scours. The remedy is to give the sow a tablespoonful of pulverized copperas in her feed and to decrease the rations at once. Overfeeding also causes thumps or shortness of breath. Coughs are caused by wet sleeping quarters in winter, dust in summer, and frequently by worms. Keep charcoal, ashes, copperas, salt, etc., where the pig can help itself. A little turpentine put in the slop occasionally will do good. Cockleburs spring up early in the spring and are sometimes eaten by hogs; the results are usually fatal. A liberal dose of grease will sometimes save the hog if given promptly. Better kill out the burrs, or take the hogs off the pasture until grass, oats, etc., have made some growth. A pig that is infested with lice will not thrive; give it a coat of Beaumont oil, and apply the oil to the pig's bed also. These are some of piggy's troubles; there are numerous other lesses troubles, besides the more serious ones, such as swine plague, cholera, etc. But all may be largely prevented by keeping the hog lot clean, providing plenty of good drinking water, and letting the hog run on some kind of green pasture.

Mr. Edmundson: I have found worms the most serious trouble.

Mr. Bell: The most trouble I have with pigs is scours, and I generally give them raw eggs. These eggs will stop ordinary cases. Another cause of trouble is the pigs fighting. My remedy for this is a pair of nippers with which I cut those little back teeth on each side.

Mr. Geo. T. Smith: I have had more trouble from fighting than anything else. Scours have given me a little trouble. My remedy is saltpeter.

Mr. Moulton: As some may not understand the real damage done by fighting, I wish to state that when fighting they bite each other's lips until their mouths become so sore that they can not bear the knocks received while nursing. As a consequence they stay away and starve.

Mr. Ruthers: When a hog is kept up a long time and then turned out he will eat the first green thing he finds, and if it is a cocklebur it will kill him. But it they are kept on green pistures they will not eat cockleburrs.

FEEDING HOGS FOR PROFIT.

Mr. W. E. Davis: Where one is going to feed hogs for profit he should push the pig from start to finish; he should feed it everything that will produce growth and flesh.

Mr. J. W. Howell: Corn is 95 cents a bushel and bran $1.75 a hundred. I don't think it profitable at these prices, and think it better to turn the pigs in on peanuts and thus save the trouble of feeding them. We plant corn and just as soon as it is in roasting ears we turn in the hogs. When they are through with the corn they are turned on the peas and peanuts. If anyone wants to raise hogs he should select some section where they raise peanuts.

Mr. McLain: I have had a little experience in feeding hogs, both for profit and for breeders, and I believe the last gentleman is a little mistaken about being unable to feed hogs corn at high prices. I have fed hogs with high-priced corn at a profit. In the northern part of the State, where we have alfalfa, we can feed that in connection with the corn and make something like 100 per cent profit on the money invested in the feed.

Mr. Blow: If corn was only 25 cents a bushel, don't you believe a hog could be fed too much corn?

Mr. Singleton: I don't believe that a hog can be fed too much corn if he has plenty of pasturage. In this connection I wish to say that this Association is up against a hard proposition in answering these questions which aim to set out a rule for all to go by in Texas. This is a big country, and there are different conditions in different parts of the State. In Northern Texas we raise corn, alfalfa, etc., but do not raise peanuts, etc. Is a man going to quit raising hogs just because he can't raise peanuts there? I agree with Hr. Howell in that there is no corn grown that will produce pork as cheaply as peas and peanuts. But each section of the State is peculiarly adapted to raising certain feedstuffs and the breeders in each section should, of course, use whatever they can raise cheapest. All of Texas soil is all right—just like all Texans.

There are breeders who believe that they can produce cheaper pork by turning the hogs out on pasturage without feeding them much corn; they will grow their hogs until they are six months old and then feed them on corn. There is another class of breeders who believe pork can be produced cheapest by feeding corn from the start. Certain conditions will make either one of their methods the cheapest, so it is hard for anyone to say which is best under all conditions. You must take into consideration the surroundings. If you have feed that is reasonably cheap, if you have corn and pasturage to balance it, my opinion is that you can produce pork.

Mr. Howell: Can I afford to feed corn at 95 cents a bushel and shorts at $1.55?

Mr. Singleton: If you have pasturage you don't need any shorts. All you need is corn. If you have not good pasturage and want to feed sorghum or Bermuda grass, you can feed corn with it and can afford to do so at 95 cents a bushel or $1.15 a bushel at the present price of pork.

Mr. Hestand: If one will keep an expense account of what it costs to produce pork on the farm it will be found that it is more profitable to raise hogs than anything else. When a customer writes me and says he has alfalfa, grass, goobers, etc., I write him that he has the ideal feed for him to go into the hog business and prosper. When one writes that he has alfalfa, Johnson grass, milo, etc., I write him as the one above. When one writes me that he has sugar cane, etc., I write him the same thing. What we want is more hogs raised and let's have hog hams as common in Texas as ducking breeches.

GREEN PASTURE FOR HOGS.

J. D. COTTEN, Van Alstyne.

Is green pasture overestimated in Texas? Most assuredly it is not. We doubt very much if over 20 per cent of the Texas farmers have any green pasture at all for their hogs. When we consider that green pasture is nature's food for all live stock in their natural or wild state, and that we can have green pasture in Texas almost if not all of the year around, we do not think the farmers and breeders of this State are likely to overestimate green pasture for their stock when so few of them have any pasture at all.

Still, on a subject like this, there are always two extremes, and some one has wisely said that either of them is dangerous. One of these is to depend altogether on green feed when pasture is good. The other is to feed corn or dry concentrated feeds the year around. We think the better way is to have a good pasture of alfalfa, barley, wheat, oats, rye, rape, mesquite and Bermuda grasses. And while the hogs are being pastured on some of the above named plants or grasses we will get the most gain at the least cost by feeding a reasonable amount of corn or dry feed to them.

I will try to give some of the reasons why green pasture is not easily overestimated in Texas. One reason is that the soil and climate are adapted to grow a variety of forage or grazing plants. Hogs take more exercise when they have the run of a good pasture and this is very helpful to them. They are also healthier and thriftier and develop better bone and muscles. So, in conclusion, let me say to the breeders and farmers of the Lone Star State, provide more pasture and better pasture for your stock, and let us raise more hogs and better hogs in Texas.

IS GREEN PASTURE OVERESTIMATED IN TEXAS?

J. C. BURNS, College Station.

I will say in the beginning that I do not believe that the possibilities of the green pasture are overestimated in Texas, but I do believe that some overestimate the feeding value of green pasture; that is, they believe that for feeding purposes green pasture will do well enough without any corn. I believe that the majority of people in Texas, however, underestimate the value of green pasture else there would be more of them in the hog business. The hog in its original state, before it was domesticated, lived chiefly on plants, nuts and the flesh of other animals.

Feed as little high-priced corn as possible, but I don't think a man should ever hold back corn in feeding breeding stock. One can not depend on green pasture alone to bring out a hog; a little corn must be fed along with it. This has been my experience; it has been the experience of others; and I find most successful raisers in this State feeding corn along with green pasturage. What we want to do is to find out the combination that will be most profitable to us in feeding corn and green pasture at the same time. We want to feed just as little corn as possible, and to depend on our cheaper pasturage for the production of our hogs.

Taking up the hog from the standpoint of pork production, I will say that the amount of corn fed must be governed by the prices of corn and of hogs on the market. Sometimes there is more profit in carrying a hog along without feeding it much corn and then tipping it off with a larger amount of corn, but as a rule I think it a great deal more profitable to push the hog from the beginning in order to get him off hand as soon as possible. In that way you can replace it and always take advantage of the market.

Then again, one must consider the proportion of corn to the pasturage, whatever it may be, that will give the most profitable results. Different kinds of pasture will require different amounts of corn to produce the best results. Hogs can not be raised on green pasture alone.

Sometime ago I began collecting data on the subject of alfalfa as a hog feed. I examined all the results of the different experiment stations; worked it up in manuscript form; and then I visited the most important hog farms in this State where alfalfa was raised and fed in combination to learn what their experience was. The results are given in the following paper "Alfalfa as a Pork Producer":

ALFALFA AS A PORK PRODUCER.

1. How much cheaper and better can pigs be grown with alfalfa pasture than without?
2. In what manner should it be fed to give most profitable returns—soiling, grazing or as hay?
3. Is it more profitable to run a pig on alfalfa pasture alone until it reaches the age of eight or nine months and then top it off with grain, or to push it on a combination of grain and alfalfa from birth till marketing time?
4. If the latter method is more profitable, what proportion of grain to alfalfa will give the best results?
5. If the former method is more profitable, what proportion of grain to alfalfa will give the best results?

These are questions the importance of which can only be realized when we come to consider the various answers given by practical pork producers who consider alfalfa an important factor in production. Kansas Bulletin No. 85, relates answers given by different farmers to the first question. Some say that by the use of alfalfa pasture pigs can be grown for half the usual cost; some one-third; some, 80 per cent; some, 75 per cent cheaper. One person claims that he can raise pigs to weigh 150 pounds without any corn. It is surprising to note the small amount of experimental data on this subject, and interesting to find that results of tests that have been made are, with few exceptions, the same, yet are very different in some cases from the opinions given by farmers on this subject. It is therefore seen that there is an urgent need of obtaining more facts along this line in order to establish definite answers to these and similar questions of importance which relate to the economical production of pork.

That pasture is one of the chief factors in the economical production of pork is the experience of almost all who have tried it, and in those districts where alfalfa thrives there is no grazing plant that will produce a larger amount of green feed per acre and last through a larger part of the year. It is one of the first to afford green pasture in the spring, and one of the last to disappear in the fall. It makes an excellent hay and is fed in this form to all kinds of live stock. Ordinarily it produces from three to five cuttings in this State, and the average yield in hay is between two and a half and three tons per acre. The average value per ton is about $14.

Farmers' Bulletin No. 31, says "One acre of alfalfa will furnish forage for from ten to twenty hogs per season. There is no cheaper or better way of producing pork than to allow growing pigs to run in a field of alfalfa. At a conservative estimate ten pigs per acre will gain 100 pounds each during the season from May to September, and one thousand pounds of pork can not be produced so cheaply on any other feed." One thousand pounds at 4 cents would bring $40 per acre for alfalfa.

Here the questions might arise as to how many hogs can be run on an acre of alfalfa yielding a given amount without killing it out or ruining the stand? And with alfalfa at a certain price and hogs at a certain price, which is more profitable, selling the alfalfa or feeding it? Knowing the answer to the former question, with also a knowledge of the true feeding value of alfalfa alone and in combination with grain to hogs, the answer to the latter must be determined for the case in hand by the law of supply and demand governing the prices of alfalfa and of pork.

ALFALFA PASTURE VS. ALFALFA PASTURE AND GRAIN.*

No. of lot.	No. of animals in each lot.	Average weight at beginning.	No. of days of experiment.	Feed eaten by each lot.	Total gain.	Average daily gain per hog.
1	4	62.5	56	Alfalfa pasture, ½ acre..........................	68	.30
2	4	67.5	56	Alfalfa pasture, ½ acre, 716 pounds of corn and kaffir.	324	1.44

*Report of the Oklahoma Experiment Station, 1899, page 27.

In the experiment reported above Lot 1, on alfalfa pasture alone, made only .3 pound daily gain per head, while Lot 2, with 716 pounds corn and Kaffir in addition to pasture made a daily gain of 1.44 pounds per head, a difference of 1.14 pounds due to the grain. Each pig consumed an average of 3.2 pounds of grain per day, only 2.21 pounds besides the alfalfa being required for each pound gained. While the stand of alfalfa was good and the season was favorable for its growth, the four pigs in Lot 1 kept it well eaten off.

According to test made with hogs on alfalfa pasture reported in Montana Bulletin No. 14, June, 1897:

Nine brood sows and forty-four March to June pigs were turned on 4½ acres of alfalfa pasture. August 22, sows averaged 272½ pounds; October 5, sows averaged 277½ pounds, making a gain of five pounds per head during forty-five days. August 22, pigs averaged 57.1 pounds; September 5, pigs averaged 65.2 pounds, making a gain of 8.1 pounds per head during fifteen days. September 5 three boar pigs were removed. September 5, forty-one pigs averaged 64.9 pounds; October 10, forty-one pigs averaged 79.6 pounds, making a gain of 14.7 pounds per head during thirty-six days, or a daily gain of .42 pounds. During both periods pigs crawled under a creep in the fence where each received 1 pound per day of cracked barley.

This test shows that the alfalfa pasture was very little more than a maintenance ration for the brood sows, while for the pigs it is impossible to conclude definitely the amount of gain produced by the alfalfa on account of the grain fed.

SOILING MATURED HOGS ON ALFALFA.*

No animals in lot.	Average weight at start.	No. days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
4	331	31	845 pounds rape, 880 pounds crimson clover, 412 pounds alfalfa, 14 pounds wheat screenings, 20 pounds oats.	25	.20
4	337.5	30	1642 pounds alfalfa..	5	.041

*Bulletin No. 80 of the Oregon Experiment Station, page 13, 1903.

The above shows a comparison of the results obtained by soiling matured hogs on alfalfa alone for a period of thirty days with those obtained with the same lot for a period of thirty-one days on rape, crimson clover, alfalfa, wheat screenings and oats.

CORN VS. WHEAT FOR PIGS ON ALFALFA PASTURE.*

No. of lot.	No. animals in lot.	Average weight at start.	No days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
1	6	146	64	1848 pounds corn chops, alfalfa pasture ¾ acre lots.	462	1.22
2	6	145	64	1755.6 pounds corn chops, 92.4 pounds dried blood, alfalfa pasture ¾ acre.	492	1.30
3	6	147	64	1848 pounds wheat, alfalfa pasture ¾ acre	492	1.30

*Bulletin No. 75 of the Nebraska Experiment Station, page 37, 1902.

In this test Lot 1 required 4 pounds corn chops for one pound gain; Lot 2, 3.5 pounds corn chops, .18 pound dried blood; Lot 3, 3.7 pounds wheat. The gains for each lot are good, and considering the comparatively small amount of grain fed per pound gain the alfalfa pasture shows quite beneficial results.

ALFALFA HAY AND BRAN VS. BRAN FOR PIGS.*

No. of lot.	No. animals in lot.	Average weight at start.	No. days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
6	3	87	62	236 pounds bran, 63 pounds alfalfa........	16	.086
4	3	99	62	255¾ pounds bran..	13	.069

*Report of the Utah Experiment Station, 1901, pages 20-22.

ALFALFA HAY AND WHEAT VS. WHEAT FOR PIGS.*

6	3	140	71	435 pounds wheat, 323 pounds alfalfa....	114	.55
2	3	196	71	697½ pounds wheat..............................	126	.59

*Report of the Utah Experiment Station, 1901, pages 20-22.

In the above test, "Alfalfa Hay and Bran vs. Bran for Pigs," there was a marked advantage in the use of alfalfa hay. While Lot 4 required 19.6 pounds of bran to produce one pound of gain, Lot 6 required only 14.7 pounds, showing that the 63 pounds of alfalfa fed in addition to this lot was equal in feeding value to 78.4 pounds of bran, or that for every pound of gain produced the alfalfa saved 4.9 pounds of bran, thus showing it to be pound for pound a little greater in feeding value than bran in this case.

In the test, "Alfalfa Hay and Wheat vs. Wheat for Pigs," Lot 2 required 5.5 pounds of wheat to produce one pound of gain, while Lot 6 required 3.8 pounds of wheat, showing that 323 pounds of alfalfa took the place of 193.8 pounds of wheat in producing 114 pounds of gain, thus showing it to be a little greater than half the feeding value of wheat in this case.

KAFFIR CORN MEAL DRY AND ALFALFA HAY VS. KAFFIR CORN MEAL DRY.*

No. of lot.	No. animals in lot.	Average weight at start.	No. days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
1	10	125	63	4679 pounds Kaffir corn meal, 656 pounds alfalfa hay.	909	1.44
3	10	125	63	3885 pounds Kaffir corn meal................	524	.831

*Bulletin No. 85 of the Kansas Experiment Station, page 14, 1898.

In this test by the Kansas Station, Lot 3 required 7.2 pounds Kaffir corn to produce one pound of gain, while Lot 1 required 5.1 pounds, showing that the 656 pounds alfalfa hay fed this lot saved 1909 pounds Kaffir corn meal in the production of 909 pounds of gain. Fed in combination with Kaffir corn the alfalfa hay in this case shows a feeding value about three times greater than Kaffir corn fed alone.

FEEDING ALFALFA HAY TO PIGS.*

No. of lot.	No. animals in lot.	No. days of experiment.	Feed eaten per lot.	Total loss.	Average daily loss per head.
1	2	21	99.12 pounds alfalfa hay................................	33.25	.79
2	2	21	99.14 pounds alfalfa hay................................	51	1.21

*Bulletin No. 40 of the Nevada Experiment Station, page——.

The above test at the Nevada Station shows the results of feeding alfalfa hay alone to pigs, one lot showing an average daily loss of .79 pound per head, and the other a daily loss of 1.21 pounds per head.

MIXED GRAIN AND DRY ALFALFA HAY VS. MIXED GRAIN, MIXED GRAIN AND SUGAR BEETS.*

No. of lot.	No. animals in lot.	Average weight at start.	No. days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
1	3	162.2	97	1228.5 pounds corn, 572.1 pounds barley, 165.9 pounds alfalfa.	330.3	1.13
2	3	154.7	97	1143.9 pounds corn, 520.5 pounds barley.	315	1.08
3	3	148.3	97	1050.9 pounds corn, 552.9 pounds barley, 297.9 pounds sugar beets.	289.2	.99

*Bulletin No. 74 of the Colorado Experiment Station, 1900.

In the above test Lot 1 required 5.44 pounds of grain and .49 pounds of alfalfa hay to make one pound of gain; Lot 2, 5.28 pounds of grain and Lot 3, 5.55 pounds of grain and 1.03 pounds of sugar beets. The cost per pound of gain was slightly greater for Lot 1 than for Lot 2, but less than for Lot 3.

ALFALFA HAY AND GRAIN VS. GRAIN AND ROOTS FOR PIGS.*

No. of lot.	No. animals in lot.	Average weight at start.	No. days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
1	4	66	80	1074 pounds wheat, barley and bran equal parts, 137 pounds alfalfa hay.	183	.57
2	4	68.7	80	1046 pounds wheat, barley and bran equal parts, 560 roots.	209	.65
3	4	65	80	883 pounds wheat, barley and bran equal parts, 233 pounds alfalfa.	134	.42
4	4	65.5	80	708 pounds wheat, barley and bran equal parts, 543 roots.	96	.30

*Bulletin No. 57 of the Montana Experiment Station, page 44, 1903.

Comparing Lots 1 and 2 in the above test we find that the hogs fed roots required less grain than those fed on the alfalfa hay for each pound of gain made. The difference in favor of the root ration is .87 pound of grain. Comparing Lots 3 and 4, we find that the hogs fed on alfalfa required the least grain for each pound of increase in live weight, which is the converse of the results of Lots 1 and 2.

ALFALFA AND SKIM MILK VS. ALFALFA, SKIM MILK AND CRUSHED WHEAT.*

No. of lot.	No animals in lot.	Average weight at start.	No. days of experiment.	Feed eaten per lot.	Total gain.	Average daily gain per head.
1	8	46.8	29	502 pounds alfalfa, 2308 pounds skim milk.	130	.55
2	8	50.6	29	456 pounds alfalfa, 2055 pounds skim milk, 112 pounds crushed wheat.	125	.54

*Bulletin No. 80 of the Oregon Experiment Station, page 15, 1903.

In this test Lot 1 required 17.75 pounds skim milk and 3.86 pounds alfalfa for one pound of gain. Lot 2 required 16.44 pounds skim milk, 3.65 pounds alfalfa and .90 pound crushed wheat for one pound of gain. The cost of producing one pound live weight in Lot 2 exceeded that of Lot 1 by .55 cents per pound. In this case there was apparently no advantage in feeding the supplementary grain ration.

CONCLUSIONS.

By the foregoing experiments we are led to doubt somewhat many statements that we hear, especially that alfalfa fed alone as pasture will produce a good marketable hog. We find without exception that alfalfa fed alone either as pasture, by soiling or as hay, afforded scarcely more than a maintenance ration, and that in one test where alfalfa hay alone was fed, there was a daily loss per head of .79 and 1.21 pounds, respectively, for two lots. Comparing alfalfa fed as hay alone and as green pasture, the results seem to be in favor of the latter. As to whether it can be most economically fed by soiling or as pasture, can hardly be determined from the little data we have on this subject.

Pigs made better gains than matured hogs when fed alfalfa alone, and considering its chemical composition, high protein content or muscle-forming constituents, we would naturally expect the results to be in favor of growing pigs.

Feeding stuff.	Percentage composition.						
	Water.	Ash.	Protein.	Crude fiber.	Nitrogen extract.	Ether Ext.	No. analyses.
Alfalfa hay.........	8.4	7.4	14.3	25	42.7	2.2	21
Alfalfa (green)....	71	2.7	4.8	7.4	12.3	1	23

Name of feed.	Dry matter in 100 lbs.	Digestible nutrients in 100 lbs.		
		Protein.	Carbohydrates.	Ether Ext.
Alfalfa hay....................................	91.6	11	39.6	1.2
Alfalfa (green)................................	28.2	3.9	12.7	.5

Considering the results of feeding alfalfa in combination with grain, we find that with the exception of one test, the gains were very satisfactory, proving almost conclusively the great advantage of a supplementary grain ration.

Likewise in comparing the results of tests made with grain alone versus grain and alfalfa, we find a marked advantage in favor of the combination, the alfalfa invariably taking the place of a large amount of grain required to produce one pound of gain. The alfalfa fed thus in combination with grain produced much higher gains than the results of feeding it alone would lead us to expect. In some cases the value in combination even exceeded that of the grain fed alone. These results lead us to believe that there are benefits derived from feeding pigs alfalfa aside from its nutritive value. Especially when fed by soiling or as pasture it keeps the digestive organs in good condition, thus enabling pigs to make better use of grain.

As to the comparative feeding value of alfalfa hay and alfalfa pasture fed in combination with grain, we have but little data, but considering the larger percentage of crude fiber in the hay which the hog's stomach is not so well adapted to handle, we are led to believe that the pasture would give the most beneficial results.

Considering the nitrogenous nature of alfalfa, we would expect practically little advantage in feeding it with a highly nitrogenous grain, while on the other hand feeding it with a carbonaceous grain we would expect most profitable results.

Although nothing definite can be said in answer to the question "is it more profitable to run a pig on alfalfa pasture alone until it reaches the age of eight or nine months and then top it off with grain, or to push it on a combination of grain and alfalfa from birth to marketing time," yet, since in nearly all of the foregoing tests a supplementary grain ration proved so beneficial and that alfalfa fed alone seldom ever proved more than a maintenance ration, we are led to believe on the average that most profitable results can be obtained by feeding a combination of grain and alfalfa from birth till marketing time. However, more data based on actual experiments should be had to definitely decide this question, and at the same time show the proportion of grain to alfalfa necessary to give the most profitable results.

ESTABLISHING A HOG PASTURE.

J. T. BELL, McKinney.

The establishing of a hog pasture is one of the cheapest ways of supplying one of the two essentials to profitable hog raising—a balanced ration. The pasture is the best, cheapest and most profitable way of supplying one side of this ration. The manner of establishing the pasture depends upon what is to be used as pasturage, and what will grow best in the county in which you live. If you desire alfalfa, which is my choice above all others, study the conditions that are most essential for raising alfalfa. Where the soil will permit I would prefer to have several kinds of pasture. The first lot I would sow in alfalfa; the second in Bermuda grass; the third in sorghum, and the fourth in wheat, oats, barley, or rye. In naming the kinds of pasturage I had in view such as will grow best in my part of the State. Other kinds of pasturage may be more suitable to other localities. If for any reason only one kind of pasturage can be provided, I would prefer alfalfa. From what I can learn alfalfa will do fairly well in most parts of this State.

SANITATION VS. DISEASE.

Colonel Coffee: The first question with a man that is starting out in the hog business is, how to keep off disease? The man that has a dirty hole where his hogs go and wallow, as they did in the old days, should quit the business, as he is a propagator of cholera. They must have nice clean water. The hog likes to wallow, by doing so he ruins the water but also leaves dirt and disease behind. If you will give it clean water morning and evening no bad results should follow on that account. The first thing is nice clean water. Then don't throw your clean feed into the mud. Sanitation means plenty of clean water with charcoal about. It is just as essential to sanitation as the sun is to cotton.

Mr. Little: Do you think that charcoal, ashes, and salt prevent hogs from becoming wormy and diseased?

Colonel Coffee: Yes; and I have added saltpeter and pepper to great advantage.

Mr. Singleton: I can't agree with Colonel Coffee altogether, but I am so near it that I don't want to take exceptions to anything he did say and we want the impression to go out that we do take sanitary measures, but we have many successful hog men who pay no attention to sanitation and never have a sick hog. I don't believe in taking medicine if I am well. And when I am sick I want some one to tell me what is the matter and what to do for it. I don't believe that saltpeter is good for every pig, and I want to know what is the trouble with that pig and what is best to give it. If you have sanitary quarters and give them plenty of clean fresh water, you will have very little use for medicines of any kind, so don't think it necessary for Texans to prepare a lot of drugs.

Mr. Hestand: I agree with Mr. Singleton. I don't believe in doctoring hogs. I give mine plenty of water, plenty of pasture, oats, barley, etc., and keep them in good clean condition. I sprinkle them with crude oil to keep off the lice, using a 25-cent sprinkler in putting it on.

COTTONSEED MEAL AS A PROFITABLE HOG FEED.

AARON COFFEE, McKinney.

Is there enough profit in cottonseed meal to advise its use as a hog feed? Aware of the fact that there is about an equal number of the scientists and practical breeders and feeders on each side of this question, I shall endeavor to be conservative and impartial in the discussion of this question. J. J. Hooper of Kentucky State College says: "Great interest attaches to cottonseed meal, especially in the Southern States, where it is to be obtained most cheaply on account of its high feeding value. As most feeders know, it serves to balance rations with corn, Kaffir corn, or other carbonaceous products. Cottonseed meal has been extensively fed to cattle, hogs, horses, and mules, and in a small measure to sheep and chickens. For all these animals it has a high feeding value in its effectiveness in producing gains." The most serious results from feeding cottonseed meal occurred with hogs, and this has led to many investigations regarding the nature of the poisonous substance, the effect upon the animals, and the means of preventing this poisonous action.

Failures in the attempts to determine the nature of the poisonous substance, the experiment stations in Kentucky, Oklahoma, Arkansas, Ohio, and Alabama, have given attention principally to finding out the amounts of cottonseed meal that may be safely fed to pigs of different weights. In Alabama pigs fed four and one-half pounds of crushed cottonseed per day lost weight or showed signs of illness. In Iowa hogs weighing 100 pounds died or became seriously ill before eating thirty pounds of cottonseed meal. In North Carolina no bad results followed the feeding of one and one-fourth pounds of the meal daily to pigs weighing 90 pounds, but when the amount was increased to two pounds a day serious trouble followed. The most extensive experiments were made in Arkansas and Oklahoma. In Oklahoma it was found that a ration composed of one-fifth cottonseed meal and four-fifths corn meal could safely be fed to pigs for a period of three weeks, but that when fed for ten weeks the pigs died. In some instances, however, such a mixed ration was fed for an indefinite period without injury, provided the pigs were run on green pasturage or fed soiling crops. Therefore, the Oklahoma Station recommends that cottonseed meal should constitute not more than one-fifth of the grain ration for pigs, that it should be fed in alternate periods of two or three weeks, and that the pigs should have green food. From the many experiments made at the Arkansas Station it must be concluded that the harmful effects of cottonseed meal is determined by the amount fed. Small amounts may be fed indefinitely, while large amounts can be fed for short periods—not over three weeks—without bad results. This station recommends that cottonseed meal be fed in the proportion of one part to five, six, seven, or eight parts of grain according to the weight of the animal. And right here I would stick a pin; the Arkansas Station has found that wheat bran is more desirable as a safe mixture with cottonseed meal than corn meal. This station found also that cottonseed meal fed to breeding stock does not produce any harmful effects when fed as just outlined above.

The Texas Station has thoroughly tested the effect of cottonseed meal upon the hog. From these experiments it appeared that cottonseed meal may be safely used in somewhat larger quantities, and for longer periods, when fermented and fed in the form of slop. The injurious effects of the cottonseed meal were not entirely removed by fermentation, but when fed in small quantities it appeared to be safe to make it a part of the ration for an indefinite period, especially when some green food was given at the same time.

Believing that I have given ample credit to the scientists' views in the matter as above outlined, I shall close the discussion by presenting some cogent reasons why I believe cottonseed meal, when fed according to the Allison method,[1] a safe and valuable hog feed. Supported by the opinions of such men as Jo W. Allison, J. H. Connell, H. E. Singleton, L. C. Estes, J. C. Hestand, and others, and from practical tests made, I do assert, affirm and believe there is enough profit in cottonseed meal to advise its use as a hog feed. I further believe the Allison method to be safe and easily followed. The great value of cottonseed meal in increasing the weight of the hog during the fattening process and the superior quality of the pork of hogs fattened on cottonseed meal over that of hogs fattened on corn alone should be an incentive to the hog raisers of Texas to use this article more extensively.

HEAVY HOGS PROFITABLE.

Mr. Hestand: My experience is that there is most profit in the young hog. I think that the little pig is the most profitable. I keep them growing from the very start and on until they are about six months old. I never keep a hog over eight months old; I think that after they are that old that it costs me a great deal more to add a pound of flesh than they are worth.

Mr. Blow: I would say the hog should never see Christmas to make it profitable.

Mr. Edmundson: I think that would put some out of business pretty early. What are you going to do with the October hog?

Mr. Blow: They are unprofitable.

Mr. Edmundson: You don't mean to say that you raise but one litter a year?

Mr. Blow: I raise two litters a year, but they are not profitable.

Mr. Edmundson: I can't see any difference. We are talking of hog raising on a large scale rather than just for family use. While I have always held ideas different from the majority of breeders and farmers on the subject of the heavy hog, I have found the most profitable crop of pigs the spring crop, if I kept them until they are ten months old.

REPLACING THE OLD BROOD SOW.

Mr. Tom Frazier: I don't believe in replacing them if they are good, and they are good if we keep them until they are old. But if we do replace them, I believe they should be replaced with something that is just a little better.

---

[1] The method of feeding cottonseed meal to hogs used by Mr. Jo W. Allison is stated in his own words as follows:

"Make a mixture in bulk, about one-third cottonseed meal and two-thirds corn chops, whole corn, wheat bran, or shorts; mix with water to a thin mush in two vessels (an old barrel sawed in two is good) and leave to sour or ferment, which will take from twelve to forty-eight hours, according to the weather and other conditions; then feed from these alternately, using the contents of one while that of the other is left to sour.

"A good growing ration may be based on one pound of dry mixture per hundred pounds of live weight. For quick fattening this may be doubled, quadrupled, or even more largely increased.

"When ready to feed add fresh water to the feeding ration sufficient to bring to a thin slop, about the consistency of sweet milk, and give the hogs all they will clean up."

Mr. Bell: I don't know how long to say they are profitable or how old they should be. The oldest one I have ever kept was eleven years old.

Mr. Hestand: My experience is along the same lines. If I have a good brood sow and she is a good mother, etc., when her litter is from eight to twelve weeks old I select every year two of her choice pigs. A brood sow should be good, kind and a good suckler. Shape and quality, too, are to be considered. If the pigs prove to be like their mother I keep all three until the mother becomes unprofitable. In this manner I would soon become overstocked on good sows; the surplus is sold to customers.

THE FARMER VS. THE FANCY BREEDER.

GEORGE FRAZIER, Hutchins.

The purpose of the farmer is to breed the greatest number from the smallest investment. Incongruous mixtures are often commended because they produce the greatest number; red, white, spotted, ringed, belted, black or blue—all look alike to him, just so they are there and are growing into marketable goods. From a commercial point of view the farmer is correct so far as immediate results are concerned. He plants, sows, cultivates, and reaps, with all his calculations compassed by a twelve month.

It is a well established theory that to sow wheat and oats together produces a large increase in yield. So with other grain and grasses. This is equally true of animal husbandry. Several times in recent years the "out or cross-bred steer" has been awarded championship honors at our "fat stock shows." But the intelligent farmer will never think of resowing his fields with the products of his previous experiment, however large the yield; for he knows the result would be a failure. So with his hogs: the first mixture gives good results, but he will not continue this process by selecting breeding stock from his cross-bred herd. Instead he selects from his herd such females as come nearest to his ideal, and purchases a pure-bred male from some reliable breeder to cross upon his mixed bred sows. And here the farmer and the fancy breeder come in contact, one supplementing the work of the other.

The fancy breeder is not a haphazard experimenter, but a breeder with fixed ideals. For foundation stock he selects from the best and most approved families of the same breed. He studies individuality. He mates for the purpose of producing the very best at all points—early maturity, easy feeding, gentle disposition, and individual excellence. When the farmer goes to select his breeding stock he finds just what he is looking for, and the only difference is the price.

FUTURE OF THE HOG INDUSTRY IN TEXAS.

J. A. BLOW, Bullard.

I feel that our President has made a big mistake in assigning this very important subject to me. However, I shall do my best and discuss the subject in a shotgun way, hoping that every shot will hit something to show why Texas should be the foremost hog breeding and pork producing State in the Union. Since farming of every kind is done in Texas, hogs enough should be kept to consume the waste that can be profitably turned into pork.

A word of caution: don't allow yourself to become overstocked; if you do, it will hurt both yourself and the hog business. It is hard to get a hired man to take charge of your hogs and make a success of the business. The hog business is not child's play nor a dude's job, but requires forethought and close attention all the time.

There is scarcely a family keeping house in Texas that could not profitably keep one or more pigs to consume the waste from their table. Pigs kept in this way I call little household savings banks. With our short winters and mild climate we can nearly always have some kind of green winter pasturage for our hogs to graze on until Bermuda grass, weeds, etc., come out in early spring. These are followed by the sorghums, Kaffir corn, alfalfa in some sections, milo maize, wheat, oats, barley, cow peas, goobers, watermelons, cantaloupes, tomatoes, peaches, plums, sweet potatoes, Irish potatoes, and other things too numerous to mention, and last but not least comes the great corn crop, the pork finisher of all the feeds.

Mr. President, allow me to say right here that we have a Corn Breeders' Association in this State, which goes hand in hand with the Swine Breeders' Association; one can't well get along without the other. This makes me believe that the farmers of Texas are taking more interest in growing good corn and good hogs than ever before. The hog business will insure a good market right here at home for all of our corn, wheat, oats, and millstuffs, and the corn will finish our pork for the market here at home.

I see no reason why the hog business should not be one of the biggest and most profitable enterprises for our Texas farmers, and I feel confident that Texas is destined to be the foremost hog raising State in the Union.

Mr. Tom Frazier: The thing to do is to get the people of Texas to raise more hogs, and to raise them on the things best adapted to their part of the country. There are some sections that can grow corn, peas, etc., successfully; others alfalfa, milo maize, etc.; but the thing is to raise more hogs. That is the proposition that is worrying the packers at Fort Worth now. They sent a committee to Chicago because they heard that another packery was to be located in Oklahoma. Why was the committee sent? Because we don't raise enough hogs in Texas. They can get all the cattle they want. I do not know just what per cent, but the packers get the larger per cent of their hogs from Oklahoma. We want to get as many packeries located at Fort Worth as possible. Until we raise a sufficient number of hogs we can not hope to keep them all in Texas, but they will go to Oklahoma. Some packers not represented at Fort Worth would come down at once if they could get the hogs. They can get all the mutton they want, but can't get sufficient hogs to work off their other products.

Mr. Mitchell: Our receipts at Fort Worth this year compared with those of last year are 15,000 short, but our weights are several tons ahead of last year's receipts. We received more hogs last year, but our total weights have increased this year. The quality has improved but the number has decreased. Ninety-five per cent of the hogs killed in Fort Worth packeries are from Oklahoma. We get from one to two cars from Texas, the balance comes from Oklahoma.

Mr. Davis: I would like to know one thing. We are informed by the secretary of the Berkshire Association that Texas has bred more registered Berkshires than any other in this section; the Poland China Association credits us with more, and the Durocs state that Texas comes second. Where are all these hogs consumed? What becomes of them, if so few reach the market?

Mr. Singleton: I think there are a good many hogs raised in Texas that are marketed outside of Fort Worth. We have packeries all over the State. We recognize that Fort Worth is our largest market; that it is the stock center of the State, but there are a great many hogs got on the markets in Texas outside of Fort Worth and perhaps that has something to do with it. How many cars do you consume a day, Mr. Mitchell?

Mr. Mitchell: An average of sixty-two cars a week.

Mr. Singleton: Did I understand you to say you had an average of two cars a day from Texas?

Mr. Mitchell: No, sir. Yesterday we had two cars in the yards from Texas and seventeen from Oklahoma.

Mr. Singleton. I seems to me that if you have only one or two cars a day from Texas it is only 5 per cent.

Mr. Mitchell: You misunderstood me. Our receipts taken from day to day and from month to month represent 95 per cent.

Mr. Cabansas: We shipped six or seven cars from Matagorda county to New Orleans last January.

Mr. Mouldin: I think there is a great future for the hog business in Texas, and from the looks of Mr. Blow's corn and other things, I think the hogs will be well provided for.

THE POSSIBILITIES OF HOG RAISING IN TEXAS.

Mr. Singleton: I want to invite the attention of those present to this fact. We are going to have some demonstrations this afternoon and these demonstrations will largely be of pork products. We have invited a gentleman down from Chicago to give us a lesson in the value of the different cuts and to show us the different points about the hog. This gentleman is with us this morning and I move that he be asked to address this meeting, choosing his own subject. We would like to hear from Mr. Ferguson.

Mr. Ferguson: I have been out strolling around with my old chum, Professor Marshall, so I am not prepared for a cut and dried talk. I am very much interested in the things I have heard this morning and these ideas have led me to believe that none of us yet have gotten along far enough in hog raising. The further along I get the more convinced I am that there is a great deal to be learned. Anything I may say now or afterwards, I want to assure you is not being said with any sectional spirit whatsoever.

There is a vast difference in producing hogs in Maine and in Texas, and we have learned, in looking over the country, that what is good for us in Maine harrasses us in Minnesota and what harrasses us in Minnesota may be good in Texas. I believe that before starting in the hog business a man should consider the condition of the soil and climate, what he can grow, etc.

Hogs go forward to the various stock yards of the country to be converted into hams, bacon and lard. And right here I want to say to you that we have found out already that this great State of Texas can not begin to supply enough hogs for its own demand. I don't know everything; I am down here to learn and did not come down to teach; but I want to say to you frankly that the first question that comes into the mind of a stranger is, Why should this State not be one of the largest pork producing States? I have talked with Professor Marshall about it and he seems to think that there are a great many more things that you can do down here than raise hogs, but if you will go up to the Western States, where the farmers are known to be so very prosperous, you will find that they made most of their money in raising and selling market hogs. I want to say to you right here that we have not yet found an animal that will bring as much money to the bushel of corn as the hog. He is an animal that brings quick returns. You don't have to wait two or three years as you do with steers, but in six or eight or ten months' time you get returns from your hogs—you get your money, and a finished hog is the same as gold bonds—you can readily get face value for it.

The first thing a man thinks of on entering the hog business is "What kind of hogs shall I breed?" This is dangerous ground, but I want to say that in the packing business there is no favoritism. When I was breeding I bred Berkshires, and after I gave up breeding and went into the packing house business, I admit that I was a little partial, but in the last four years I have cut out breed lines entirely. A hog is a hog and in the packing business we have use for every kind of a hog and there is no prejudice in breeds, so far as packers are concerned.

The first thing I believe a man should do, who is going into the hog business, is to consider his feed supply, what kind he can grow. Then look around the various breeds and consider the breed that has been doing the best under existing conditions. Perhaps your neighbor has been pretty successful in growing a certain breed of hogs. It is best sometimes to not try to get all the experience yourself. If you are going to start in the business and know what you are after, and if you are satisfied the Poland China or the Berkshire or the Durocs will suit your conditions, the thing to do is to purchase a full bred boar of that breed. I don't believe it is wise for the average man to go into raising full bred hogs; too many lose money at it. Why? Because they are not accustomed to it. It is a special business in itself.

Concerning alfalfa, I want to say that the man that grows hogs and makes money out of them in this or any other section of the country that does not use every available foot of pasture suitable for the hog is behind the times. You want to stay very close to the feeding proposition, but when you can substitute the various grains and let your hogs out in alfalfa, you are reducing the cost of production from 25 to 50 per cent.

I was in Colorado last year and I found that they were growing hogs; that under favorable conditions alfalfa thrives very well there. I was informed that they were producing pork for 1½ cents per pound. The men up there are making money out of hogs. They tell me that down in this section of Texas you can grow alfalfa well. In the Indian Territory and around Denison I saw the best alfalfa I have ever seen. Those that are in the business should look favorably on alfalfa. We had a hog ranch out in Wyoming on our own account and we found that we could economize 25 per cent to 50 per cent by using alfalfa. But don't make the mistake by concluding that when you grow and feed alfalfa you can dispense entirely with corn. You have to have some corn—some dry feed with grain in it to properly finish him with.

There is more money in the hog than any other farm product. I have watched the markets year in and year out and have taken the records for the last twenty-five years and compared them and find there are less fluctuations year in and year out on pork products than on anything.

It was only a few years ago when it was impossible all over the country to get good ham and bacon, but now you can go anywhere and have good bacon and ham and sausage. What does it mean? That the people of the country are waking up and growing hogs. The doctors are prescribing crisp bacon for convalescents. I want to say to you that today pork is selling fully twice as much for home consumption than it was five years ago.

In this connection I want to bring out one more point. I don't want you to get the idea that you want to grow 900-pound and 1000-pound hogs. The average breeder does not want heavy weights and the markets want hogs finished from 175 to 250 pounds. The day of the great, heavy barrow has gone by. We are now growing hogs for bacon and ham and not for lard. There are too many other things that we can make use of in place of lard.

THE COST OF FENCING AND EQUIPPING A FORTY-ACRE HOG FARM.

J. C. HESTAND, Sherman.

In my effort to tell you how much it will cost to go into the hog business, we take it for granted that you now own or have rented forty acres of land, with a house, barn, smokehouse (no, I take back the smokehouse, because all cotton farmers' smokehouses are in Fort Worth), chicken house, orchard, garden, well of water with pump in it, horse lot, cow pasture, three mares, two cows, some chickens and all necessary tools to raise corn and cotton. A good wife and five smart, good looking, red-headed children; but all run down, sunburnt and willing to quit raising cotton and to go to school so they may become prosperous, progressive hog-men.

The first expense is to fix plenty of water for hogs. To elevate a tank, and lay pipe so it will force water through the house and to all the hog lots, will cost about $125. To build one hog shed 16x64 feet and feed bin, will cost about $75, complete. This is room for eight sows to farrow in.

Fencing horse lot, yard, garden, orchard and cow lot, hog tight, will cost about $75. To fence forty acres and cross-fence twice, will cost $160. This will make seven departments for hog pasture. Dipping vat, $10; breeding crate, $10; loading chute, hurdles, tooth nippers, ear marker, oil can and sprinkler, $5; telephone, $6.

Seeding 15 acres to alfalfa, $50; seed wheat or barley for small patches, $5. The next expense, $200 for eight bred gilts; $15 for a boar pig; $100 for books, hog journal, newspaper, and new clothes. For the hog man's family can read, dress, visit, and go to school. Now, if you will figue up, we have spent about $911 getting ready to run forty acres to hogs.

Please pardon a little digression, and I will give results; divide crop as follows: Put 15 acres to alfalfa, cut three tons per acre, 45 tons, at present price, $600 worth of hay. Put 20 acres to corn, at 50 bushels per acre, 1000 bushels, at present price, $600; put 3 acres to oats, 150 bushels, at present price, $75; put 3 acres in lots, orchard, garden, etc., and you have the 40 acres all in use. Count 15 pigs to each sow a year and you raise 120 head of hogs, weighing 200 pounds each, at six months old, and they are worth $1500 at packers' price.

Two mule colts worth $150. And I know the good wife and children have sold at least $100 worth of chickens and eggs, $100 worth of butter, two nice calves worth $20, and canned enough fruit and vegetables to do all winter.

Now, let us add again, for all hog men believe in adding. Our gross income is about $3145. Subtract the $911 spent to start, or equip with, and we have a nice balance of $2334. Spend $100 every month for expenses, and you will still have $1234 in the bank at the end of the first year, and $61,700 in fifty years off of only 40 acres.

In conclusion I will say that somebody has raised taxes mighty big; so, to be able to pay, we must quit raising cotton, and go to feeding the pig.

Mr. Blow: I think that dipping tank could be cut out and the $10 saved. I use a sprinkling can to apply the disinfectant.

Mr. Davis: In using the sprinkling can, how do you get the disinfectant in the ear, under the flank, etc.?

Mr. Blow: Spray the hog until it looks as if it had been out in a rain; this will get the disinfectant all over it.

Mr. Singleton: I think every advanced breeder believes that the dipping vat is much more effective than sprinkling. Crude oil is the most effective thing I have ever used for lice.

Mr. Tom Frazier: Brother Hestand, you don't know how good you make me feel; I didn't know I was so rich. You sold everything, but didn't have a thing to buy. How did you manage to sell your corn and also the hogs?

Mr. Crawford: Several years ago I practiced Mr. Blow's method of sprinkling, and found that I could not get rid of all the lice. Two years ago I put in a dipping vat. Crude oil costs about $1.50 per barrel. The vat holds about 300 gallons of water. I put about six gallons of crude oil in it. A runway or dripping board is attached to the vat and catches and runs back into the vat much of the dip that drips off. When the hog goes through this vat he is thoroughly saturated and I find it entirely satisfactory. The oil may be left in the vat until used again, when a little more oil must be added. The trouble is less than in sprinkling.

THE BEST WAY TO ADVERTISE.

J. P. MOULDIN, McKinney.

First select some good reliable paper in which to advertise. Use some good stock journal that will put your "ad" before the class of people interested in your line of business. With the number of good stock papers and journals now published, you should have no trouble in selecting one that will place your "ad" before many more prospective purchasers than you are able to supply.

Another very important point is this, that before advertising you have something to offer and that what is offered will make good what is claimed for it in the advertisement. In this way you will establish a reputation for being reliable and trustworthy; your advertising will yield results that are pleasant and profitable to yourself and to your customer. You well know that everyone who advertises desires to make a strong impression on the buyer as to the degree of fineness and high quality of his stock. He should be equally desirous when shipping out stock to maintain the favorable impression created by his advertisement.

My idea as to how long an "ad" should run depends upon the amount of stock one has for sale. My experience causes me to think that only the large breeders are compensated for keeping their "ads" running continuously, and that a small breeder had best advertise only at such times when he has stock for sale. Otherwise he may be swamped with inquiries, and having nothing on hand he is prone to neglect answering them. An inquiry is perishable property. If not given immediate attention it will go to waste. And every inquiry you let go to waste for want of promptness on your part does that much to destroy the effect of your advertising.

Another most excellent way of advertising is the show ring. The benefits to be derived are two-fold: you have an excellent opportunity to gather ideas from the best judges in the land, which should better fit you for attaining more nearly to perfection in your own line: and as an advertisement, whatever degree of excellence is awarded your stock in the show ring, the buyer has not your word only but the corroborating evidence of a recognized judge and the public as well.

I know of no one way of advertising that is better and more effective than all others; but by combining the ways I have mentioned, using the show ring, the columns of some good stock paper or journal, keeping your herd strong in point of breeding and individual excellence, and giving prompt attention to all inquiries you will receive the best and most satisfactory results.

Mr. Tom Frazier: I believe the best way is to advertise all the time. The very fact that when one picks up a paper and sees an "ad" that has run from month to month gives the reader the idea of permanency. Very often, if in years after he wants anything, he will write to the man whose "ad" was kept constantly before him.

Another thing. Mr. Mouldin says, "First be sure you have something to offer." That, of course, is of first importance; have the right kind of stock to send out. But no less important is the condition in which it is sent out. If it is sent out in good condition, it will please not only the man who receives it, but the eye of every man who sees it. How often have we received orders from buyers who saw our stock in transit?

Again, when you make a shipment see that it goes out good and clean. You seldom see good results come from a pig sent out in a filthy dry goods box and the pig covered with dirt. On the contrary, when you see them go out in a nice, clean condition, well crated and finished, the pigs clean and labeled with a nice card, an outsider sees it and will send in an order.

THE SHOW RING; ITS OBJECT AND PURPOSE.

TOM FRAZIER, Morgan.

Why, I thought everyone knew that the only object of the show ring was to win a little ribbon and a few dollars and to advertise our stock and sell some stuff and to accumulate a lot of petty jealousies and hard feelings for the other fellow who was rash enough to think he had anything as good as ours. and to explain why the judge was prejudiced for or against some certain hog or breeder, and then after all this to go home and feel mean for a month or two. Too often the show ring is looked upon as above mentioned, but there is a higher object in showing livestock of all kinds in competition with our neighbors and others.

We are all striving, or should be, to produce something a little better than we or our neighbors have, and it is a laudable ambition so to do. How, if we remain at home and see only our own stock, is this to be done? How are we to know whether we have succeeded, or are merely following out some individual idea which after all may be erroneous? It is only by meeting in the show ring and comparing the work of others along these special lines with ours and by bringing animals of similar ages and classes together and having them compared by a competent judge.

Another thing is the educational value, not only for the exhibitor and breeder, but the broader one of educating the people, the masses, as to what constitutes a good animal. This is an object that is too often lost sight of. There is no better place for this work than at the show ring of our county, state or national fairs, for there we find the very best of each breed from each herd, from widely scattered sections and developed according to many diverse views. It should be the object of everyone to set aside personal views and the "my and mine" idea and to see the best animal win, regardless of where or by whom bred or how and by whom and on what fed.

Another thought along this line. It is too often the case that the breeders who exhibit at our fairs seem to have the idea that when they have fitted and shown their stuff that their mission and duty at the fair is ended, but such is not the case. Exhibitors owe a duty also to the fair association which at much expense has brought the immense crowds seeking knowledge and amusement to a common meeting place. They ought to keep their exhibits in clean and attractive condition, their stock in good shape, and be present or have a competent man present to answer questions promptly and politely to the end that even the man who is merely seeking "the biggest hog" may go away with improved ideas as to what constitutes a good animal and as to the values of well bred stock and a higher opinion of the man and of the industry he represents.

SCIENTIFIC STOCK FARMING AS TAUGHT AT THE A. AND M. COLLEGE.

PROF. F. R. MARSHALL, College Station.

The first institution in America to create a separate department of animal husbandry was the University of Wisconsin. Within the last few months a prominent writer has classed that institution as the most successful seat of learning in the United States, because it is "the instrument of the State." It is the endeavor of the A. and M. College of Texas to be the chief instrument by means of which the extensive agricultural resources of Texas are developed until we reach the maximum and most economical production of the various crops and the people engaged in agriculture have the most thorough understanding of their calling.

The College does not claim that its graduates are competent to successfully compete with middle-aged and self-taught farmers. Nothing can take the place of experience. Pure practice is vastly superior to pure theory, and a judicious combination of the two still superior to either one alone. The young men who receive the greatest benefit from the Agricultural course are those of eighteen years of age and upwards, who have had a good elementary education, and have lived long enough on a farm or ranch to know they really want to be stockmen. Such men leaving College know best how to utilize the theories and directions explained to them by the instructors. It would undoubtedly be a wise thing to require that all candidates for admission to the agricultural course must have spent not less than two years on a farm or ranch. The most of the students in agriculture have had but indifferent opportunities for becoming proficient in the advanced study of those public school subjects which constitute the foundation of every kind of education, consequently provision is made for a continuation of those studies in the beginning of the College course, along with some of the practical subjects, such as stock judging and fruit growing. A certain amount of time must be devoted to those parts of physics and chemistry which, though not of direct use to the farmer, are essential to a useful understanding of the higher branches of science that give control of and insight into the fertility of the soil, the growth of animals and the digestion of the food and kindred topics.

The young man who finishes a college course is properly expected to be of some public benefit in his community, and not only to know the results and teachings of all the investigators and experimenters, but to be able to impart his learning to others.

Because most of our students need to continue the study of the branches taken up in their home schools and in order to give them the proper foundation for a mastery of the sciences relating to agriculture, and in order to give them familiarity with public affairs, the course has been laid out for four years' work. In the freshman year the student devotes about one-half his time to subjects of directly practical character, including the judging of stock. In his second year he begins a study of the sciences that lead up to an understanding of chemistry, botany and animal diseases. At the beginning of the third year the student elects to make a special study of horticulture, live stock or grain growing. Those who decide to study live stock during the last two years of their course are then relieved of all work in English and mathematics, take up some work in the dairy, give special attention to veterinary science and continue their chemistry into the higher and more practical branches. In this third year there is given a series of lectures upon the breeding of stock and the various books for registered stock are studied with a view to gaining an insight into the methods of past and present day successful breeders. Throughout the course it is endeavored to have the student continue the accumulation of experience by coming into actual contact with the matters taken up in lectures and text-books. Every subject has its accompanying practice period. In the stock judging work theory is kept in the background. The best way to become a good judge of stock is by judging stock. It is possible for the student to have extensive experience in this at the Agricultural College. He is permitted to make mistakes and sometimes led into them in order to test his judgment, and to bring the correction closer home.

When it comes to breeding and feeding of live stock it is impossible to allow each individual to control the mating of or to feed breeding animals. The teachings and explanations of the class room must be backed up by such observation of the stock maintained at the College as will make clear that the practice advocated in the class room is actually being successfully used in the pasture and feed lots. For this reason we say the completion of a four years' course does not mean that the recipient of the B. S. A. degree is an expert breeder or feeder. If he is made of the right stuff, and has had some practical experience before entering College he will do well from the start, and may be an outstanding success. If, however, he has not experienced the actual contact with stock he will realize but slowly the possibility of making a practical application of his College studies. If it is in him he will become a stockman much more quickly than he would have if entirely self-taught.

The foregoing relates entirely to the four-year course. As a matter of fact that course appeals principally to boys who realize the advisability of securing a broad education, and have or can secure the necessary finances. During the last year or two we have found that there are a large number of young farmers who have gone far enough to realize that it would be an advantage for them to take a year or two to learn what is already known about their business. Some of these men are already fairly well educated, and have no need of studying any high school subjects; others can not afford the time to study subjects that do not bear directly on their work; still others can not pass the entrance examination to the four-year course. The College is under obligations to teach these men and has, this year, for the first time, provided a two-year course. This two-year course is open without examination to men over eighteen years of age. It includes all of the purely agricultural studies now taught in the four-year course. Two-year course students can decide for themselves whether they will give most time to animal husbandry or some other branch.

V. TEXAS BEEKEPERS' ASSOCIATION.

SUCCESSFUL BEEKEEPING.

F. L. ATEN, Round Rock.

I think there is only one thing necessary to make a success of the business, provided other chances are favorable, and that is to go into the business and *then stick to it.* I have stayed with it through thick and thin, although it has been several years since we had a good crop of honey. Where there were thousands of colonies before, I am about the only one left now. Then I had to ship my honey away from home, because others sold theirs to the people of our community at lower figures than I could sell for; but now I sell at home and at greatly advanced prices. Had I done as many others did—gone out of the business because the poor seasons discouraged me—I would not now be selling honey profitably. However, I stuck to it, and can now say I am reaping the reward, and make a success of beekeeping.

Mr. D. C. Milam: If one is going into the bee business for only a year, or as long as everything is bright and favorable, then he had better not go into it at all, but stay out. The first essential to success is the determination to stay with the bees. Of course, the location must be a good one, where plenty of honey can be obtained. The bees will then almost take care of themselves. But during times of scarcity of honey it takes a beekeeper who will stay with the bees to make a success of the business.

Mr. W. O. Victor: There is enough in the bee busniess to pay a person to stay in it if he stays in it right.

SELECTING LOCATION FOR AN APIARY.

LOUIS H. SCHOLL, New Braunfels.

There are several points to consider: first, sufficient honey-yielding flora; for my sole purpose in keeping bees is to produce as much honey as possible. The next item is permanent water. It is important, as the bees need a goodly supply of it almost the year round. Lack of water means a decrease in the quantity of honey. Besides want of water may give rise to trouble with the neighbors. Here in the South one must look to shade for the apiary. Natural shade is to be preferred; nothing suits me better than a grove of mesquite trees. This gives a partial shade in summer and is bare of leaves in winter. Mesquite abounds in South Texas. I prefer a sloping piece of ground, that slopes toward the southeast and is protected by a woody growth or outbuildings on the north. The hives face southeast, so the heat of the sun during mid-day strikes the hives diagonally from the top corner of the front end of the hives.

In locating outyards these same considerations are regarded. Whenever a locality is found where sufficient honey-yielding plants abound, a spot is sought that is near the road, easily accessible from the road, and just far enough from the residence that the bees may be seen but not give trouble by stinging. I prefer to have a wire fence around the apiary, so that stock can not bother.

Mr. T. P. Robinson: I agree as to the study to be made of the flora, water, and shade; the latter may be constructed of boards, but I care nothing for sloping ground, as it makes no difference; neither does the direction in which the hives front matter.

Mr. C. S. Phillips: I care nothing for shade, since I raise the covers and place a small cleat under one end of them during hot weather; this gives circulation through the hives.

ARE THE HOLY LAND AND CYPRIAN BEES AN ALL-PURPOSE BEE FOR THE AVERAGE BEEKEEPER?

W. H. LAWS, Beeville.

This could be answered with one little word "No." The Holy Land and Cyprian races of bees from their irritability, in my opinion, can never become favorites with the beekeeping world. Neither can they ever be classed as an all-purpose bee. After two years' experience handling a yard of Cyprians and their crosses they were discarded, their stinging punishment was simply unbearable; however, these were fine honey gatherers, strong breeders and extra prolific.

Five years later, on recommendation of a friend, I procured from a breeder in the United States, a half dozen queens of the Holy Land race; fearing lest these too, like their cousins, the Cyprians, might be too obstreperous for comfortable manipulation, these bees were tested very carefully for the first season and finding that they lacked much of the vicious temper of the Cyprians and seeing much of merit in these bees, an out-apiary was started. In a number of years these bees, by careful handling, were very satisfactory, both in temper and results.

In later years a fresh importation came from Jerusalem. From this imported mother, without thorough testing, a large number of young queens were reared, and introduced into my Holy Land yard. This late importation, while they proved themselves extraordinary as honey gatherers, and were beautiful in their markings, they at the same time were the most wicked bees to handle that I have ever seen, not even excepting the Cyprians. There were times and conditions when these bees could be handled with impunity. At the cessation of the honey flow, when brood rearing would wholly or partially cease, these bees could often be handled without smoke or veil, remaining quiet on their combs while being handled by the operator and exposed to most all manipulations would keep their temper.

In comparison with the Italian bees we would unhesitatingly say that for an all-purpose bee, considering gentleness, honey-gathering, prolificness, beauty in markings, general domestic habits, there is no race or strain of bees that will equal the best strain of Three-banded Italians.

I will sum up by saying that with two years' experience with Cyprians, eight years with perhaps the largest yard of Holy Lands in the United States—150 colonies, I have decided to discard all but the Italian race, which I sell and recommend as a general all-purpose bee.

Mr. Louis H. Scholl: During my thirteen years of beekeeping I have experimented a great deal, and hence it was that I tried nearly every race of bees. The common blacks and the German brown bees, with all kinds of hybrids, were the bees I began with. Then the Three-banded Italians, Goldens, and imported Italians were given a trial. All along, and at different times Holy Land, Cyprian, and Carniolan queens were introduced and their qualities tested. Also the Caucasians, Albinos, and several others were given my attention. But of all of them a good strain of Three-banded Italians will give better satisfaction as an all-purpose bee for the average beekeeper.

While with the Hyde Bee Company a few years ago, we had each of the eleven yards stocked with a different race of bees, and two of these yards I remember particularly. The Medina yard was supplied with Holy Land queens, and as a number of the colonies were hybrids to begin with, further crosses and with Holy Land blood at that made them worse than hybrids. I shall always remember our extractings at that yard. It is impossible to estimate the hundreds of stings we received. They were honey hustlers all right, but their stinging made them an unfavorable lot. The Cyprian yard was worse than the Holy Land.

While connected with the department of entomology at the A. and M. College I made further tests of the different races. There were not only five colones of each race represented in the College apiary, but my own apiaries at Hunter, Texas, were requeened. Thus one apiary was composed of Italians and Carniolans—an equal number of colonies of each; another yard of Holy Land and Goldens, etc. After many years of such experimentation I concluded to quit, settling on a good, well-bred strain of Three-banded Italian bees. If these are bred by always selecting the most desirable, being pure to begin with, they can be improved a great deal. A strain can be produced that will cap their honey white and be desirable for comb honey as well as extracted, and good enough for anybody.

IMPORTANCE OF GOOD QUEENS AS COMPARED WITH OTHER REQUISITES TO SUCCESSFUL BEEKEEPING.

T. P. ROBINSON, Bartlett.

Build our hives of bronze, make your frames of gold, thread the foundation with silver, and stud the threads with diamonds, but unless you have a queen to lay the eggs you are no better off so far as honey is concerned than is the man with a boat forty miles from water. The importance of the queen is paramount. She is the mother of the colony. Upon her daily work at the proper season will depend the success or failure of that colony. The successful apiarist must be able to ascertain whether the queens are vigorous and possess great egg producing capacity, and supplant all that are not in prime condition. By simply installing queens from some ideal mother that would record a 10 per cent increase of bees at harvest time, one would be able to increase his income equal to 10 per cent, or $1 in $10. Is this enough inducement to the apiarist?

But a good queen is not all; she must be furnished a suitable home with abundance of combs of the right sort. First in importance in successful beekeeping is the queen; second, the equipment; third, the management; fourth, neatness and cleanliness; and fifth, doing what needs to be done now, not to morrow.

Mr. W. H. Law: The value of a good queen is untold, yet we see too many beekeepers with old, worn-out queens in their hives. With one of these old grandmothers hanging on the combs, it is useless to expect any surplus from such colonies. A colony usually supersedes its old, failing queen after the honey season, but one can not depend on their doing it, hence it is better to requeen every fall.

Mr. J. W. Pharr: It is not profitable to leave it to the bees to supersede their old queens, since too often they are retained in the hives long after they have failed entirely, resulting in a queenless colony. I would recommend requeening twice a year, and that is not too often if one wants to keep his colonies provided with good queens.

Mr. T. P. Robinson: I object to such advice on the ground that he who gives it must either be a queen breeder or have queens for sale. Twice a year for requeening is too much.

Mr. J. W. Pharr: Everybody that has ever handled queens any length of time knows well that out of every lot of queens there are always some that do not come out well, and it is such that should be replaced as soon as discovered. That is why I say requeening twice a year is not too much.

Mr. Louis H. Scholl: I believe it will be well to say a word in regard to what is meant by superseding or requeening twice a year. By requeening twice a year we mean that we requeen all colonies with undesirable queens, and later requeen again all those whose queens did not prove satisfactory. I can not see any objection to such advice. I have requeened even oftener than that; requeening during the entire season or whenever I found a colony whose queen should be replaced by a better one. That, I think, is really the proper way to requeen, for I am not in favor of wholesale requeening every fall, because there are many queens that would be better another year than the ones we might supply would prove to be. This matter can not be left to the bees. Some times they do, some times they will not replace a failing queen. By replacing all failing queens and by retaining the good ones satisfactory results will be obtained.

Mr. D. C. Milam: I object to requeening in the spring. It takes a good colony of bees to gather the early April honey crop, and if requeening is done in the spring the colonies will not be in shape to get it. Nor would I requeen all the colonies in the fall, as most of my queens have done their best in their second year.

Mr. T. P. Robinson: One of my yards, four miles from home, was never attended to as far as requeening was concerned. They requeened themselves from year to year. I did no requeening at this yard for five years.

Mr. F. L. Aten: It is a mistake to requeen every fall. One of my queens four years old did good work and her colony gave more honey during those four years than any colony I ever had. Requeening gives the colony a setback, and should not be done oftener than is necessary; all depends on the queen.

Mr. Louis H. Scholl: If all the colonies that need requeening are given new queens after the honey season is over, it is the best time to do it. We generally have a late fall flow, and if queens of the same fall's raising are given they will yet rear a good batch of young brood, and young bees that go into winter quarters will come out vigorous and healthy in the spring. Colonies wintered with such a lot of bees and such a fall-raised queen and plenty of stores will be a booming one the next year, and such queens are not so apt to swarm as older ones.

MAKING HIVES AT HOME.

O. P. HYDE.

A supply of good hives is a subject that is of interest to every beekeeper in this State. The best hives for the least money is what we all desire. For the information of those present I will state that I now procure hives much cheaper than I did some time ago, when I purchased Northern made hives. Three years ago I put in a small plant for manufacturing beehives. The first year I used long leaf hard pine; this wood proved to be too hard to work. The second year I bought a car of northern white pine. I have now been making white pine hives for two years and find that I can produce just as good hives as I could

buy in the North, and they are much cheaper. This is the reason why I am going to continue along this line. White pine can be purchased cheaper than native pine.

Mr. D. C. Milam: I do not like home-made hives. Hard pine makes a hot hive and causes the combs to melt down. White pine and cypress is best, but cypress is too expensive.

Mr. W. H. Laws: To be successful a beekeeper should make his own hives. He has found the home-made hive very satisfactory, besides it being less expensive. He buys fair, selected, soft pine at $30 per thousand; uses a two-horse power gasoline engine, which costs $140.

Mr. T. P. Robinson: Makes his own hives; has some made twelve or fourteen years ago; uses a windmill to run his shop. Hives complete cost about 60 cents.

Mr. C. S. Phillips: Makes his own hives.

Mr. W. H. Laws: At one time he wished to buy 400 or 500 hives complete. After getting dealers' prices, he found it would pay him to purchase an engine, saw table, and an outfit for making the hives at home. In this way he not only saved on the supply, but made enough to pay for the outfit.

Mr. W. O. Victor: Hasn't time to make his own hives, and a good carpenter is too expensive; so he purchases his hives from the factory. Thinks the prices on hives are too high now as compared with the prices of several years ago.

WHY I PREFER THE SHALLOW DIVISIBLE HIVES AND SUPERS THROUGHOUT.

LOUIS H. SCHOLL, New Braunfels.

There are a great many reasons why I prefer shallow divisible hives and supers throughout to the deeper ones. I shall not enumerate them all. One important reason for having the shallow super throughout is the advantage of having all hive bodies of the same depth, size and shape, just as you would have in case you were producing extracted honey with the deeper frames. However, I claim that there are many reasons for using the shallow frame supers not only for comb honey but for extracted honey also. For proof of this I need only refer to the practice of our most successful beekeepers. Not only do I prefer the shallow supers for the reasons stated, but since I want all my hive bodies and supers alike I prefer the shallow hive in twos or more for the brood chamber. This arrangement has the advantage of enabling me to manipulate my divisible brood chamber in many ways that I could not do with solid or deep frame chambers. This advantage has been of great value to me at times.

For the purposes of examination I know of no better hive than one made up of shallow frame bodies; by one glance one can look it over; and one can examine at close range the precise part one desires to look into, as the hive can be pried apart at almost any point. This convenience is especially helpful when one is looking for queen cells during the swarming season. I have been able to "knock swarming in the head" by using shallow divisible brood chambers; I was unable to do it with the deep hive. The way to accomplish this is to slip a case of empty combs between the two sections, thus splitting the brood nest, and relieving the crowded condition of a solid mass of brood, which is too often left undisturbed in the deeper hives and brings on the swarming fever. By inserting the shallow hive I supply laying room for the queen and clustering room for the bees, and thus remove the conditions that bring about swarming. And it is done in a very little time. Can you do it so completely and easily with a deep hive and without handling the combs? And even if you insert combs in the center of a deep frame brood chamber, do you at the same time improve the condition of the brood nest to the best possible shape for adding your comb honey or other supers later? I have not been able to do it with deep hives as I have not been able to get rid of the honey stired along the top bars over which bees are loath to store. After the super has been slipped into the brood chamber, the brood chamber will be remodeled by converting the added super into the brood chamber proper; the brood in the uppermost case is crowded down and is filled with honey, which would otherwise be stored in the brood nest and clog it, crowding out the queen and weakening the colony. This, of course, is detrimental during a long flow, or when there is a later flow. Besides the bees are much slower in beginning work in supers above such a brood nest. I have the advantage of placing my supers over brood nests that are practically bare of honey, with lots of brood to keep the colony strong after the flow is over; and the beauty of it is that I obtain an extra super of extracted honey and more comb honey from the fact that the bees begin sooner and work later.

In preparing the hives the roofs and floors are the same as in any other standard hives, and the cost of the divisible brood chamber is only a slight one over deep ones.

As regards the use of shallow supers I know of nothing better for procuring at least a partial crop during an off or unfavorable season, or from weaker colonies, as I know from an experience of over ten years that a super of shallow combs may be filled, whereas the bees had not begun in the deeper ones.

In removing the honey from the hives the shallow supers come off so much easier; no handling of combs; no brushing or irritating of the bees or bruising combs of honey. All that is needed is a good smoker and a hive tool. The cover comes off with a jerk; a volume of smoke sends the bees scampering away, and the super is yanked off and stood on end, cover replaced on the hive, and you are ready for the next hive. I have many of my hives arranged in groups of five and work them all at once; that is, I take the covers off all five, smoke all the bees down, and the supers are removed. In this way less time is consumed in getting the bees out of the way.

You are aware that for comb honey shallow supers are used almost universally; why not use them for extracted honey with the same advantage, for they are surely better for this also. Foundation of lighter grade can be used in full sheets, and it pays to use this. There is no wiring of frames; no handling of combs until they are full and ready to be taken out in the honey house.

Just a word about fine comb honey. Only a few days ago I tasted some of the famous Southwest Texas honey. It looked nice, indeed, but my the "gob"—the mouthful of wax when it was eaten. There's where one of the greatest mistakes is too commonly made—whole sheets of brood foundation used in deep supers for comb honey. I have not been able to produce as fine an article with deep supers as with shallow supers.

For extracted honey I have come to prefer the shallow super more and more. I can take off the honey faster, and have less trouble uncapping same. Of late years I have been hauling all my honey to a central point where a house is equipped with complete outfit for putting up the honey. Three, four or five of the apiaries nearest one of these substations are worked at that place and the honey from the apiaries nearest New Braunfels is taken to my home and put up there. This requires hauling all of my honey in supers, and for this reason I am glad that I have adopted the shallow super, for the combs in the deep supers are not adapted to this purpose. The heavy combs break out, even if wired frames are used. On my spring wagon I have hauled loads of 1500 to 2000 pounds of heavy built out combs of both comb and extracted honey, for distances of 8 to 20 miles and during the hottest days. Very few combs were broken in transportation, while many built in deep L. frames broke out and leaked considerably.

I wish you to bear in mind that I am not advocating such lines to be adopted by anybody else; I simply give you some of my experience as I have found it and some that has helped me to procure just a little more honey, I believe, than most of the beekeepers would have obtained in the same locality, or even I myself if I had used another hive and method.

I am somewhat proud of the fact that only recently the same kind of hive and method of management as I am using has been adopted by a few of the leading beekeepers of Germany. I learn this from some of my correspondents in that country.

Mr. McGuffin: I have been using shallow hives ever since I learned of them through Mr. Scholl's writings, and I prefer them to all others both for comb and extract honey. I only wish I had none of the deep ones.

Mr. W. H. Laws: I have long come to the conclusion that it is a nice way to handle colonies in shallow frames, as I have quite a number of them, acquired through accident or by purchase of bees. However, I am so used to deep L frames and have so many of them that it would be hard to change. There is a disadvantage in having two sizes of frames, as they get mixed in the hives, and if shallow frames are used in deep bodies the bees build combs below the bottom bars.

Mr. C. S. Phillips: I use the shallow supers throughout and get more capped honey. Besides one can produce nicer comb honey on thinner foundation.

SOME SHORT CUTS IN THE MANAGEMENT OF OUT-APIARIES.

W. O. VICTOR, Hondo.

I will begin by saying "don't do as I do, but do as I say do," for I am sure I can tell more along this line than I have ever yet been able to practice during any one season. I will assume that the locations for out yards were carefully selected with a view to easy access, honey flora and permanent water, that the hives in use were carefully chosen, and that a good strain of bees has been secured.

The first short cut I will mention should be taken as soon as you return home from this meeting. You should carry everything with you that will be needed in putting out-apiary No. 1 in first class condition. Examine each hive in succession and do everything that can be done at that time to improve its general condition; take special note of the queen, pass on her, and if she does not come up to your idea of a good queen, brand the hive so you can see it every time you go into the apiary, and let the brand stay in sight as long as that queen stays in the hive. The proper time to requeen a hive that has a poor queen is the *very first time* that you can replace the poor queen with a good one. Bear in mind that the queen is responsible almost entirely for the difference in the amount of honey stored by different colonies in the same yard. Work right on through the yard if the bees will allow it, being careful not to get up a robbing spell; if they want to rob, change jobs for a while, but stay right there as long as you can find anything to do, that will better the condition of the yard. If you can not examine all the hives and put them in first class shape on this visit, mark your place so you will know where to begin next time. It is possible that several trips must be made before all hives can be examined and put in absolute first class condition. Each apiary should be worked over with equal care; this done, I consider that the most important short cut has been taken. Don't think that you have until March or April to do this work, for the earlier you get it done, the greater the influence it will have on the crop of honey. I would not have you conclude that hives once in condition stay that way for all time, because they do not, and it will pay to give frequent inspections, each time doing everything that is needed to be done.

Short Cut No. 2. During the fall and winter get ready everything in the way of fixtures that will be needed during the coming season, and have them right where they can be gotten handy. Know where everything is, so if you can't get it yourself you can tell some one else where to find it, even in the dark, for you may have to work on a 20-hour per day schedule during the honey flow, if short cut No. 1 was well carried out. Always prepare for an average crop, and then if things look good in the spring you can easily fix up for a boom crop. I will also mention in this connection the honey house, extracting tent or wagon. I have tried all with varied success, and have decided in favor of a good *bee-proof* honey house. If the range is good and can sustain a large number of colonies, and the location can be secured permanently or for a term of years, I would prefer a good house at each yard. If conditions favor numerous small apiaries, I would prefer a central honey house. This central house should be large enough to conveniently care for extracting outfit, tanks, cans for a season's crop. I would suggest 20 by 30 with 14-foot walls large enough for say 500 to 1000 colonies. The first floor should be of concrete. The second floor should be 7 feet above the first. The equipment for extracting should be a 4 to 8-frame honey extractor; two uncapping boxes, each large enough to hold the cappings from 5000 pounds of honey and mounted on rollers so when one is full it can be rolled out of the way and left to drip while the other is being filled; two medium size honey tanks into which to strain the honey and where it can remain long enough for the particles of comb to rise to the top and be skimmed off; a good gasoline engine to run the extractor; good, sharp honey knives, etc. I have in mind numerous minor devices that I shall not take time to mention that I have found helpful. The upper story is for the extracting room, work shop, etc., and the lower story or basement for the packing and storing of honey and cans.

A good spring wagon capable of hauling 3000 pounds is necessary. The bed of this wagon should be lined with galvanized iron to prevent leakage. The body of the wagon should be securely screened to keep out bees, and covered with good canvas to protect the honey from sun and rain. With such a wagon and a good team an immense crop can be taken to the central honey house where it can be extracted, packed and labeled at a minimum cost and in a manner that would be almost impossible if done at each yard. There are many other advantages to this central honey house plan that I might mention, but time forbids. There are numerous objections to the plan, which I will leave for the criticizers of my pet scheme and hobby to bring out.

Having thoroughly complied with Nos. 1 and 2, we are now ready to watch the general outlook, and rest up for the main rush of the season. As soon as the hives are well filled with bees more room should be given by adding extracting or comb honey supers as the case may be. Do not wait for the bees to become badly crowded, or for the honey flow to be well on, or you might spoil what would otherwise be a good honey season by forcing a swarming fever, which knocks out all chance of getting the best results. Frequent examinations should be made for signs of swarming, and colonies that are preparing to swarm should be divided or "shook."

The next important and most interesting thing in the business, is the taking of the honey; this should be done the *very first day* any is ready to come off, and should be pushed from day to day, else the bees might run it over you, get crowded, begin swarming and cause a heavy loss of honey. Be prepared to take an average of ten pounds per day per colony, and do it if necessary, and success is assured.

EXTRACTED AND STRAINED HONEY DESCRIBED.

F. L. ATEN, Round Rock.

Some think that extracted honey and strained honey are the same. This is the difference: extracted honey is obtained by taking the combs in the frame from the hive, shaving off the cappings, and placing the uncapped frames of comb in an extractor, which carries the comb round with such velocity that the honey is thrown from the cells without injury to the combs. The combs thus remain in good condition and are replaced in the hive to be refilled with honey. To build these combs consumes much time on the part of the bees. Beeswax is bee fat. To make this wax the bees do not go to the fields, but just stay at home and eat honey. This is what makes beeswax so expensive. By placing these combs back in the hives all the bees can go to work to refill them at once. Should the combs be cut out as in the case of strained honey, the bees must first build combs before they can store honey.

Strained honey is obtained this way: Go to the hive with knife, cut out the combs, cut the combs into small bits, then place into a can with a strainer in the bottom, and apply pressure. You have all the pollen mashed up in this honey, which accounts for the strong taste and bad flavor of the honey. This is the reason why so many farmers have lost interest in producing honey for their home table. They will say that the honey from some other locality is of better flavor.

To handle bees without causing them to sting, you must work with them while they are at work gathering honey from the field. Select a nice, clear day, when there is no appearance of rain or norther. Let the wind be blowing gently from the south. First smoke the entrance a little, not so much that it will frighten the bees or cause them to run out of the hive. Then gently raise the lid with a chisel, and smoke them a little under the lid. If you smoke them too much, it will anger them and they will sting you. I have worked many days in the bee yard without being stung.

COMPARATIVE PROFIT IN THE PRODUCTION AND SALE OF EXTRACT, BULK-COMB AND SECTION HONEY.

T. P. ROBINSON, Bartlett.

This subject is broad in its scope. I beg leave to give my personal experience. I have produced all three grades of honey and placed them on the market. There is no comparison of the profits in producing these three grades in my locality; extract honey outstrips the other two so far that they are lost sight of.

To begin with we will consider the production of extract honey and use that as a basis of calculation. There are three important items to be considered in the production of extract honey. First, little labor attaches to its production and taking from the hives; second, it can be produced during weak honey flows, when it is possible to produce the comb varieties; third, during protracted honey flows the crowding of the queen is very much lessened. It has been my experience and observation that bees will not build comb until they need it; hence, when we compel bees to build comb, as is the case in comb-honey production, there results a great crowding of the queen.

My experience goes to confirm the statement that, taking the apiary as a whole, the bees will fill two supers of extract honey, or 100 pounds per hive, as quickly or quicker than they will fill up one super with comb honey. To equalize results in money values, the comb honey should sell at twice the price of extract honey; extract honey at 8 cents a pound and comb honey at 16 cents a pound. As a matter of fact, however, the comb honey sells for about 10 cents a pound. Thus we would receive $5 per colony for the comb honey while the extract honey would yield $8 per colony. Besides, in producing the comb honey, we subjected the queen to crowding and thereby curtailed the productive capacity of the colony in case the honey flow is a long one. Whereas, if the honey flow is weak, the bees will build comb very slowly, if at all, and thus reduce the honey yield seriously. In the case of extract honey, the combs are ready to be filled thus saving the stores the bees would consume in building comb. The bees store honey with a vim that is surprising when the honey flow is right. If the honey flow is weak, the bees will, nevertheless, store some surplus. If the flow be long, the queen is more likely to keep her colony strong, since the bees will have a place to store the honey without crowding the queen.

We must not lose sight of the fact that it requires a great deal more labor to produce comb honey.

As to sections, they are an abomination. There is four times the labor attached to their production that is required in the case of extract honey, and four times as much kicking when you go to sell them. They are fit only for the fellow who care nothing for his time and has more labor than thought. Bees will not work in the sections until every nook and cranny of the brood nest is filled, so the queen is crowded to "seat." Then the honey flow must be a good one and the colonies strong to get them properly filled. Should the honey flow terminate suddenly the bees will "bob off" the whole business and the apiarist will have a lot of sections on his hands which can be sold only at a great discount if salable at all. What about the equipment of the super? It will have to be cleaned and scraped yearly and every now and then some of the equipment will have to be bought anew. Furthermore, to add to the section crank's troubles, section honey is hard to get to market without a great deal of loss by breakage and leakage. It usually sells for 2 cents a pound more than chunk comb honey. If foundation is used in the production of chunk comb honey 60 or 70 cents per hive will have to be deducted from the profits to pay for such foundation, extra labor and shortage. When we combine chunk comb honey with extract honey in sufficient quantities to prevent the chunk comb from mashing, we are nearer the equal money value on extract and comb honey production.

My experience leads me to believe that in my locality the production of extract honey is 25 per cent more profitable than any of the comb varieties. I would take contracts to produce extract honey at 8 cents per pound in preference to comb honey at 11 cents a pound. You ask what about selling the extract honey? Thus far I have not been able to supply the demand. I produce both extract and comb honey, mostly the former. The extract honey is much more in demand in my case.

Mr. G. T. Rawls: Extract honey is more profitable with me. Yet if foundation be used in the comb honey supers the difference in the yield of comb and extract honey is not so very great, and I have a demand for both.

Mr. F. L. Aten: For years when I first kept bees I produced nothing but extract honey, but of late years I have had to change and produce comb honey also. The demand for extracted honey was weak, while that for comb honey was strong.

Messrs. Aten, Robinson, and Rawls all cut out comb honey only after they have orders for it; they extract that which is not sold as comb honey.

Mr. W. H. Laws: If this matter is reduced to figures rightly there is not so much difference between comb and extracted honey prices. During a honey flow bees build comb naturally, and if foundation is given in addition to this, our cost of comb honey production is lessened a great deal.

STORING HONEY AND GRANULATION.

W. H. Laws spoke on the location of a central "station" where a main honey house was arranged for taking care of the entire crop of honey, which, he says, he did not favor before. The late L. Stachelhausen, of Cibolo, Texas, and others were using such arrangements and each person has his own methods of fixing up a system for taking care of the crop. He has always used a tent, carrying it with the extracting outfit from yard to yard. But it is a good idea to have at least one main honey house permanently located at some central location where all the main work can be performed. Especially is this a great benefit since our honey will granulate. At this house can be kept permanent tanks and apparatus for reliquifying granulated honey or for heating all the honey to a certain temperature before shipping.

J. W. Pharr claims there is a great advantage in such a system, since large tanks for keeping the honey in storage for a time can be installed. Storage improves the honey in that it gives it time for all the small bits of wax and other particles to rise to the top, so when the honey is drawn off from the lower part of the tank it is perfectly clear. If these tanks can be placed in the sun, it is quite possible that the heat would keep it from granulating for some length of time at least.

Udo Toepperwein says that it would require a temperature of about 155 degrees to keep the honey from granulating. While 152 degrees will be sufficient for some kinds of honey, others require a temperature of 160 degrees. The former named will not stand 160 degrees, and care should be taken not to heat any of it to more than 152 degrees, to prevent danger of overheating and spoiling the flavor.

Louis H. Scholl related some experiments carried on at the experimental apiary several years ago for the purpose of ascertaining whether the heating of honey would prevent or retard granulation and what degree would be the proper temperature to heat the honey. Bottles of honey were used in this experiment. Half a dozen bottles were heated to the following temperatures and sealed at once: 128, 130, 137, 145, 148, 153, 158, 162 and 168 degrees, and a few bottles were filled with unheated honey for a check. The latter, all of it having been put up in February, granulated in two weeks' time. Some of the other honey of different temperatures, even of the highest, 168 degrees, showed signs of granulation during the same cool spring months. During the next winter about one-half of the bottles of all the temperatures were granulated to some extent; that is to say, some of those heated to 168 degrees showed just as much granulation as those of the lowest temperature; and again, some of the bottles heated to 128 degrees showed no more granulation than some of those of higher heating. Why this difference, since all was put up the same way at the same time, is not understood. There was a remarkable difference in the taste of the honey of high and low heating, however. The high temperature affected the taste and the flavor to the extent that it scratched the throat. Hence it will be seen that 168, or even 162 degrees, is too high, besides it did not prevent granulation any more than the heating to a lower temperature. It is a hard matter to say which would be the right temperature for all honeys, but it is safe to say that about 155 degrees will not injure the flavor of most all of our honey, and will retard granulation as well as higher heating, which does not prevent it anyway.

THE EFFECT OF THE PURE FOOD LAWS ON TEXAS HONEY PRICES.

UDO TOEPPERWEIN, San Antonio.

The pure food law is one of the best and most important laws that was ever made for the beekeeper. I never heard of a beekeeper wanting to sell anything but pure honey and the consumer realizes that, and if the beekeeper and consumer could deal together direct the beekeeper would have no difficulty whatever in disposing at a good price of all the honey that he can produce. Much more honey would be consumed if the people could feel safe that every pound they buy is pure. In Texas there was hardly ever any but pure honey put up; the adulterated honey that was sold here was put up in other States and shipped here. Now since the pure food law is in effect this can not be done and the consumers are aware of it, and for this reason we have a better demand now for extracted honey than formerly. A great many people buy comb honey because they want to be sure that the honey is pure.

The pure food law causes the demand for extracted honey to increase, and the difference between comb and extracted honey is going to be less. So many people would just as soon or rather have extracted honey than comb at the same price so long as they know it is pure. A great many people who would not eat honey formerly eat honey now and are willing to pay a fair price for it.

The only way I can sell honey is to show my buyers where it is profitable for them to handle it and the way I do it is this: I guarantee them that the extracted honey has all been heated not less than 152 degrees and that it will not granulate within thirty days from date of shipment. Then I put the price where they can move it. When they are backed up with this guarantee, they are willing to handle it, and do handle it and sell it.

I have heard different beekeepers mention that they would simply not heat their extracted honey as it was too much trouble, saying that they could find buyers who are willing to buy it just as it is taken from the hives. This was true the past spring before the buyers knew how fast honey will some times granulate. When honey granulates some beekeepers will not take it back, leaving it on the hands of the wholesale dealers saying that it was in good shape when they shipped it. This may be true; they may be legally correct, but the buyers do not want to handle honey any more. Such business injures every beekeeper in the State, and we should encourage our neighbor beekeepers to heat every pound of extracted honey they sell; then it is not apt to granulate within thirty days. If we give them this guarantee then we can readily dispose of our honey and the price will go back to where it should be and where it was this spring. If we do not do this and urge our neighbor beekeepers to do the same, the demand for bulk comb honey will decrease.

We should encourage the use of bulk comb honey. As beekeepers in other States do not put up much of this kind of honey, we have but very little competition, while extracted honey can be obtained from almost anywhere.

We can get more for our honey than beekeepers in other States because we have the demand for it right here in our own State. Our crop usually comes before honey is shipped in from other States, which always helps us a great deal in holding a steady price on our product. The best way to do would be for the beekeepers to correspond or have meetings and decide at what price they can afford to sell honey, then inform the wholesale dealers giving them the prices and assuring them that the beekeepers will not sell direct to the retailers which ruins the wholesale trade every time. When the beekeeper sells to the wholesale dealer he is sure of getting his money; when he sells to a retailer he loses an account every once in a while, which makes up as much as the difference in price would be.

If the beekeepers would do like the onion growers, sell all their honey to one or a few buyers at a set price, they would not glut the market; and when there is a steady price and the goods are put up properly, there will be no trouble whatever to dispose of all the Texas crop at a good price.

THE PRICES OF HONEY FOR TEXAS BEEKEEPERS.

UDO TOEPPERWEIN, San Antonio.

The beekeepers of Texas can ask and receive a good price for their honey, and they usually get a good price. Just at the present time the Texas market is considerably lower than it was in the spring and the main cause is this: A number of the beekeepers did not heat the extracted honey before selling, and naturally it granulated. The result is that many wholesale houses all over the State have from 100 to several hundred cases of granulated honey in stock and do not know what to do with it. Some of them melt it up, skim off the comb and sell it for extracted honey; others sell it cheap in the granulated form, just to dispose of it, and in that way lose money on the granulated honey. None of these men care to buy any more honey. When the wholesale houses quit buying honey, the market price is going to come down and no one can prevent it. These wholesale dealers are, as a rule, very square and fair people to deal with and are willing to pay the beekeepers what the honey is worth, but when they get stuck with a lot of granulated honey and lose money by handling it, then they do not care to meddle with it any more. Had every beekeeper heated the extracted honey to say 152 to 160 degrees this spring, before pouring it over the comb, there would have been but very little trouble of this kind and honey would have moved rapidly at a good price all through the season.

Mr. W. H. Laws: This is an important subject and needs ventilation. If the honey granulates on the dealer's hands so that he can not get rid of it, it is our own loss, as we will not be able to sell him any more honey. Just such a case as this has happened to most of us before. We were unable to get cans early enough, and later in the season the honey granulated on the dealer's hands after we did get it there, so that a glut of the market was a result. This caused a great loss to both the beekeepers and the dealers. After it was all over we saw how it could have been prevented by having heated all of our honey just as Mr. Toepperwein tells us now. The heating of the honey before packing would enable us to get better prices, besides preventing a glut of granulated honey in that we would be enabled thereby to keep it longer instead of rushing it on to the market for fear that it will granulate on our hands.

W. M. Jones related a case of this kind of trouble in his own town where a firm bought a case of honey from a distant wholesale firm. This arrived in the granulated state, and being comb honey was not salable. The result was that this firm did not want to handle honey any longer, so that it was impossible for him to sell even his own honey to them. In this way, it will be seen, the beekeeper is injured.

C. S. Phillips buys a limited amount of honey every year to fill any orders beyond his own supply. He gets it late in the fall and all of it is usually granulated and has to be reliquified. It is necessary to educate the people about granulated honey, and each package ought to bear label giving directions for reliquifying the honey. He wishes also to impress upon the minds of the producers the importance of putting up their honey in better shape. It should be strained through fine cloth before it is put in the cans. All the honey that he has bought had to be strained before it could be used.

Mr. W. O. Victor: Speaking of labeling packages of honey with instructions for reliquifying the contents, if granulated, it is a mistake to word such labels "All honey granulates," as some kinds of our honey do not granulate. The "Rattan" honey, for instance, I have kept for years and it remained liquid. Hence we should say "Most honey granulates."

In shipping honey it is important to sell direct to consumers and not to commission men. Then the honey can either be delivered in the liquid state or arrangements could be made with the customer for reliquifying the honey in case it arrives granulated. If honey has to be reliquified in order to strain it before it can be used, then no honey should be bought from such producers who do not strain their honey before shipping. I use a sack for straining all my honey and it is clear before it is shipped.

All honey should be heated before putting it over comb honey to prevent danger of all granulating. In one instance we extracted on Saturday and when we resumed work on the following Monday the honey remaining in the extractor had begun to granulate. The pure food law is going to help us wonderfully. It will strengthen the confidence of the consumer in purchasing more extracted honey. Hence the demand for this will increase. Then the granulation of such honey will be of little harm, while with comb honey it depreciates the value considerably.

For reliquifying honey I have a vat holding fifteen cans, and three rounds can be made a day, by leaving the last lot in the vat of hot water over night. It does not take much time, and if done the honey stays liquid well.

"BABY" OR LARGER NUCLEI.

F. L. Aten has tried the small "Baby" nuclei, but finds that the large three-frame nuclei gives the best results. These pay him best and after he is through with queen rearing with them he can build them up into full colonies while the small ones are practically a dead loss to him.

W. H. Laws finds it very easy to make these small nuclei in any desired number to accommodate any number of queen cells that he may have at any time. They have the advantage of mating with a few bees a large lot of queens, while it takes much work and more bees to do the same thing with the large nuclei. In this case these are only used for mating and are not carried over through the season. It is necessary to make the small ones oftener and that may be more work, but they are not a loss at the end of the time of mating the queens, as all bees are united into one colony with a queen. Whenever he has a large lot of cells ready to transfer to nuclei he makes the small ones, preferably with the bees from the colony that built the cells, by first putting a cell into each, then pouring in a small gill cup full of bees and closing them up with the entrance stopped. Then they are all fixed in the same manner, piled up in the shade for twelve to twenty-four hours when they are hauled at sundown on a wagon to some selected spot in a pasture several miles away. Here they are placed, with the entrance open, in all kinds of position, under fence or bush and weeds, so they will be in the shade during the day. Some of these were hauled a distance of fifteen miles at times. Out of a lot of fifty-eight thus brought out one October he got forty-eight laying queens. If the nuclei are brought out in the evening the bees will be contented in them the next morning. At the close of the season they are all united into one colony. There are not enough bees in these small boxes to withstand the cold weather in winter nor the summer's sun, hence they need to be protected against these. During the season the few bees keep up the stores of the small miniature colonies and brood rearing goes on. The combs are kept over from one season to another and used again so that there is not any loss.

J. W. Pharr says that the large three-frame nuclei are used most and are easier to carry over the season. With these it is not necessary to go to so much work restocking so many small boxes with a new lot of bees when a number of queens are to be mated. With the large nuclei several queens can be mated with the same bees during one season. And when these get overpopulous a comb can be drawn from them and used for new ones, or if not needed, to build them up into strong colonies. It must be admitted that these larger nuclei are less work. The small ones are a great saving, however, when a great lot of cells are to be taken care of at once as during the swarming season some times. On one such occasion he had on his mating grounds 372 of the baby nuclei, from which he obtained 333 laying queens.

HOW THE MONEY APPROPRIATED FOR FOUL BROOD IS USED.

A. F. CONRADI.

The control or eradication of foul brood in the States of this country presents a variety of experimental problems. We have no uniform system that we can adopt at the present time, while judging from the proceedings of the inspector's meeting held in San Antonio last November there is such a great difference in the effectiveness of the methods with reference to the different States that not even a tentative conclusion would be possible. Furthermore, it appears to be an open question as to the disease we are dealing with. A great deal of investigation is necessary to determine that point.

In considering the uses to which a foul brood appropriation can legitimately be applied it occurs to us that we have yet to determine upon a given line of procedure.

When an orchard is infested with San Jose scale we know what ought to be done. There was a time when we did not know it, and the only course of procedure was to destroy every vestige of the plant that was infested. We are satisfied that absolute destruction is the most effective process in controlling foul brood, provided that the operator follows intelligently an accurate system of quarantine measures.

In the quarantine and inspection work against plant pests we have long known that the great trouble is not with orchards, the owners of which are operating on a business basis. The problem in most States has not considered the fellow in the backwoods who has only a few trees which receive no attention whatever. When such trees are approached by an inspection officer the most desperate resistance is offered by the owner to the conscientious purpose of the inspector. This same condition presents itself in foul brood work. We have no difficulty in treating infested apiaries that are owned by men who are operating the bees for "what there is in it."

The foul brood work in this department was directed, therefore, along three lines of procedure:

(a) The actual inspection and destruction of hives and colonies.

(b) The treatment of colonies, when favorably situated, in order to determine whether other methods are practicable by which losses to individuals might be reduced.

(c) Scientific work in the field and in the laboratory.

During the first year of operation we apportioned the money as follows: $600 for the first (a), $120 for (b), and $80 for (c.)

Owing to the size of the State and the absolute impossibility of organizing inspection routes due to the lack of knowledge of the distribution of the pest, it was necessary to alter the apportionments and add the $120 to the $600 in order to carry out the work to the best advantage. One who has never traveled much in this great State is not aware of the amount of money consumed in transportation expenses, as compared with the actual operations in the apiaries. During the second year this was partly overcome by the appointment of local inspection officers. In order to procure the most desirable inspectors it was arranged that no appointments be made from this office unless the person's name was approved by the local Beekeepers' Association. Where associations failed to make such recommendations, and where it was imperative to meet the emergency, this office appointed deputies regardless of associations. The management of the experimental apiary feels that no mistake was ever made in appointing deputies.

During the second year the apportionment, as suggested in the first place, was carried through the season. Considerable material was sent into this office, the greater part of which was absolute foul brood.

It is believed that the situation is well in hand, and a report will be made if the beekeepers desire it. It is a serious matter to report the disease from a man's neighborhood as it reflects on the business of the fortunate as well as the unfortunate. All notes therefore are filed in the office of the State Entomologist like notes on other pests, and are not available to anyone except to such who have the disease in their neighborhood, whenever the constituencies involved in the various problems desire it.

The Experimental Apiary has an equipment at the present that compares at least favorable with any in the country. Its foul brood equipment is scattered owing to the undesirability of operating the laboratory in the bee house. With the completion of the new insectary this fall, provisions have been made for a fine brood disease laboratory where all incubators and other appliances belonging thereto will be placed in operation. The problem of cross-breeding and hybridization of bees and foul brood work will form the two prime factors at the experimental apiary for the next few years.

In conclusion we give the following statement of expenditures of the moneys appropriated for foul brood by the Twenty-ninth Legislature.

	First year.	Second year.
Field expenses, including transportation and operations	$720 00	$600 00
Laboratory	80 00	80 00
Treatment other than destruction of bees		120 00
	$800 00	$800 00

A long and heated discussion followed the above paper on foul brood inspection. It is understood that no appropriation has been made for carrying out this work and hence the beekeepers could not expect the necessary protection in case the disease were brought into a neighborhood. It is claimed by the beekeepers that they have just as much right to be protected, as they pay taxes on their bees. Something must be done to protect the beekeepers' interests against the depredations of foul brood and other diseases, and steps should be taken to provide for some measure whereby this would be insured them. At the close of the discussion the following resolution was formulated by the members of the association to present to those in charge of the matter for consideration:

"Resolved, That we ask the State Entomologist in charge of the Foul Brood work to use the funds of $800 a year, appropriated for the College Apiary, first in putting the College Apiary in perfect condition and maintaining it for the purpose for which it was intended, both for educational use and for carrying out experiments pertaining to our industry; and be it further

"Resolved, That a certain part of this fund be so used for foul brood inspection and experimentation work that the present foul brood law, which carries with it no funds for enforcing the inspection work, may be carried out to such an extent at least that the apiaries in immediate danger may receive proper protection until new funds for foul brood inspection can be obtained; and further

"Resolved, That the Secretary of our Association meet in conference with the State Entomologist and ascertain what method of procedure may be taken to obtain such protection as the beekeepers of Texas must have to guard their interests against the ravages of foul brood.

"THE TEXAS BEEKEEPERS' ASSOCIATION."

QUESTION BOX.

Question: What is the best equipment for rapidly taking off a crop of honey?

Answer: A good smoker and help.

Question: Do bees gather honey and pollen at the same time or on the same trip?

Answer: Yes.

Question: Which package meets with the most demand on the part of the buyer?

Answer: For wholesale trade, the 60-pound cans, two in a case; retail trade, glass jars and tumblers. Honey looks dark in tin pails and should not be used when selling by showing the honey to the customer. Instead, place a little in a saucer and it will appear light and "make sales." There is a good demand for 3-pound cans and 6-pound and 12-pound friction-top pails in cases of ten each, and it seems that this will increase.

Question: Are bees able to sting while you hold your breath?

Answer: Yes.

Question: How many colonies should one man try to work by himself?

Answer: This depends on the man. About 200 colonies with the necessary attention when a large crop is made will keep him busy. With more bees some help would be necessary.

Question: What is the best article to use for making smoke?

Answer: With most beekeepers the very first thing that is dry and handy. Mr. Victor uses wood-pile chips, and keeps sacks filled with it in the buggy shed ready to be taken out to the yards. Mr. Toepperwein prefers split corn cobs. Dr. Phillips, rotten wood and rags, and D. C. Milam has cedar bark most handy and prefers it.

Question: Is manufactured "Weed" foundation or that made by hand mill the best to use?

Answer: It seems that home-made foundation is worked quicker by the bees. "Weed-process" is tougher. By dipping the sheets of the latter kind in warm water before giving it to the bees it will be accepted as readily.

Question: What is best to use in case of bee stings?

Answer: A little honey rubbed over the wound, or warm smoke blown over the stung place will ease the pain. Ammonia is a good remedy in most cases. The majority of beekeepers present only laughed at the idea of applying anything; not to pay any attention to the stings but to grin and bear it and soon get used to it. But in case of an accident or if visitors, especially children, are stung, it is always better to know what to apply to prevent making enemies. And it must always be remembered that not all persons can stand the bee sting alike. In some cases it causes swollen eyes for several days, high fevers in some persons, even producing effects similar to "nettle-rash" some times. For fevers of this kind bathing the parts in cold water seems to be most effective. Permanganate of potash is recommended for bee stings. A little of this fluid is applied, which leaves a brown stain for several days, but which gradually disappears. This is a good remedy for all kinds of stings and bites, even of snakes.

Question: Are bee stings good for rheumatism?

Answer: Several cases were reported where rheumatism was cured by bee stings, while some persons claim that the effect of severe bee stings seemed to result in rheumatism.

VI. WOMAN'S EDUCATIONAL AND INDUSTRIAL ASSOCIATION.

TEACH THE GIRLS TO BE HOMEMAKERS.

Maria Belle Thornton, Howth.

"The Beauty of the house is Order;
The Blessing of the house is Contentment;
The Glory of the house is Hospitality;
The Crown of the house is Godliness."

We hear so many say, "Oh, I don't mind some kinds of work, but cooking, washing dishes, etc., is such drudgery!" Are you surprised that girls reared in such homes carry the same ideas into homes of their own and become mere housekeepers, from necessity, and not homemakers? Why not teach the girls by example and precept that work that has to be done, when done cheerfully and not grudgingly, is as fine an art as she can be mistress of? It seems to me a mother should instruct her daughter in all the branches of homemaking; for what true woman does not look forward to the day when she shall be a homemaker for some dear one? How often you hear mothers say, "I'd rather do the work myself than be bothered with showing the girls," but that is an injustice, for sooner or later every girl has cares and responsibilities, and how much better she is fitted to cope with these if the mother has given careful training in the home. Did you ever know a woman to regret that she knew how to sew, to bake good wholesome bread or cake? Did you ever know one who was ashamed of her skill in pickling and preserving, or one who was unwilling to admit that she could arrange a table, order a dainty meal, or if necessary prepare it herself? No, indeed; but many women have spent years in learning to do these things of which they should have had some knowledge from childhood. Our girls are sent to college, given a so-called higher education, but the truest, best education that can be given any woman is to fit her to make a true Christian home. I love music and art, and I think girls should be given the best education that can be obtained, but I see girls growing up with the idea that these things are far more important than to learn to be good homemakers. Our need today is more homemakers and fewer grumbling, untrained housekeepers. We have a college for industrial training in our State of which we are justly proud, but many of our girls will never have an opportunity to attend; so let the mothers of our country see the importance of home training and send forth girls that are fitted to make happy Christian homes.

MODERN CONVENIENCES FOR FARM HOMES.

Mrs. J. H. Connell, Dallas.

Our President has asked that we lead in the discussion of Farmers' Bulletin, 270, issued by the Department of Agriculture "On Modern Conveniences for the Farm Home." It is generally true when discussing subjects such as this, and especially a bulletin from Washington, that we are too prone to agree with all its suggestions. This I shall do to a limited extent, but, with your permission, I will tell you in the beginning that I do not agree fully with it all as I do not consider that it is written for the use of the people living in our Texas climate. The plan of the houses shown are cramped and compact, and not suited to the needs of our long summers and short winters.

The House.—To begin with, we need here, large, airy rooms, many windows and doors, high ceilings, and plenty of hall space for the sweep of our delightful breezes.

There is also an elaborate discussion of the water supply system and sanitation of the premises which suggestions are excellent, and if these plans were only carried out, many farm homes would be turned into delightful places of comfort. The entire cost would be nominal and getting water for our domestic uses is not difficult. In Texas, we use bored wells principally and water is usually not hard to reach as it seems that in all sections of the Southwest a plentiful supply flows freely not far from the earth's surface. The bulletin suggests that windmills, gas or gasoline engines, hydraulic rams, etc., be used for pumping the water. These are all good, but the windmill appears to be the best, easiest and cheapest method of getting the water for a limited supply. The windmill is propelled by our strong winds, one of the very few things of earth that is free. They need little repairing, and they are so constructed that the power may be used to grind feed, shell corn, saw wood, and last but not least, to the women, do the washing and churning at no additional cost. An elevated tank holds the water and from here it is carried into the house. A bath room should be one of the first thoughts in building this home, or if an old home, then add this necessity and luxury. Have a kitchen sink and the tubs for the laundry with faucets above them and the waste pipes so arranged that it will not be an effort to handle the water. The bulletin suggests that if tubs are used in the kitchen, then have a shelf fixed on hinges over them so that when not in use it can be turned into a kind of table. This is good, but a wash room put outside of the house is better. The plumbing should be good and well put in, but need not be elaborate, and should not be complicated. The waste from the house should be carried away from the house by tile pipes and emptied in a piece of sandy land or else on a prepared piece of soil, treated with ashes or charcoal, and when we have pure water available for the house, we may easily have troughs in the barn lot for the stock. This water is cleaner and better by far than the tank or pond water that stagnates and by midsummer is a pool of wiggletails, and finally mosquitoes and is a frequent breeder of typhoid fever, probably because the milk from the cows is contaminated by its filth.

Now do not conclude that I am theorizing on this subject and do not know whereof I speak. I am country born and spent all of my childhood days on a farm with my parents and grandparents.

Furnaces are fully discussed. According to my idea of the Texas farm home, this is not necessary. Large, old-fashioned fireplaces for wood are not only more convenient and comfortable, but are more healthful because of ventilation, and are more cheerful than any other method of house heating. What is more delightful than a cozy living room, its large chairs, good books, or companions, and its brightly burning wood fire? Perhaps it's an open grate and coal; if so, you are still delightfully comfortable, for they rank next to the wood fires.

Now, what kind of lights for this home? I would suggest acetylene gas. In a beautiful new home in the center of a ranch, eighteen miles from Fort Worth, this gas is used for both lighting the house and for cooking purposes. A stove like the ones used for natural or artificial gas is used for the acetylene gas with perfect success. This is not expensive and neither are the fittings and fixtures for its use.

In furnishing such a house, I would prefer if it were mine, stained or painted floors with rugs and would use the greatest simplicity in the furnishing of the entire house. For bed rooms it is again fashionable to have rugs, not carpets, woven like our grandmothers used, and we all have new scraps and even old scraps made from worn clothes and bed linen, sheets and pillow cases, that color beautifully with diamond dyes and when woven into rugs will make the room artistic and beautiful. I saw some bedroom window curtains decently made from cream colored cheesecloth, hemmed and a simple design stenciled on it. The pattern for stenciling was cut out of heavy cardboard and ordinary house paint thinned with turpentine was used. These are pretty without stenciling, however.

Have a broad porch or gallery and use it as a summer living room. Make sunshades of matting or ticking sewed together and hung from the top of the porch. Hammocks, chairs, and flowers add to its charm and comfort. An easy swing made from a legless cot, covered by a light matress or comforts and pillows and hung with four trace chains from the ceiling is delightful to the tired men of the house, or to yourself, if used for a little nap in the open air. Of course the tea table and magazines would add to this resting place and a cup of tea could easily be handed the visitors who drop in to spend their afternoon, and in no other way is hospitality more easily dispensed. If we have children these little things will do much to refine and cultivate them and will many times keep them at home and free from temptation. Even if they do wander away the thought of such a home will do much to bring them back, and what is the use of "the strife of life," if our children are not to be *men* and *women?*

INVENTIONS THAT HAVE ENHANCED THE DOMESTIC PLEASURES OF FARM LIFE.

MRS. ANNA MCDONALD, Kurten.

The farm I live on is always a rented one, and I don't find many inventions to lighten labor or to enhance pleasure. Now, domestic inventions must mean those we use about the house, and those that enhance the pleasure of life on the farm must be those that lighten our labor or give us more leisure, or do better work. The cooking stove certainly facilitates the work of feeding hungry humanity, lightens the labor, and gives more pleasure in serving meals than any other with which women have to do, and yet there are some who declare that food cooked in ovens on the coals tastes much better than those prepared in the more modern way. The reason for this must be that those who say so have usually derived this conclusion from eating on camp hunts where they had to do the work themselves, which gave them a sharp appetite, and I may add, if one has a good appetite no other sauce is needed. When all kitchens are supplied with oil stoves, which do not throw out so much heat as wood stoves, cooking will be a pleasure and boys can go a fishing because there will not be so much stove wood to cut.

The coal oil lamp is certainly an improvement upon the tallow candle, which our great-grandmothers had to spend so much time to provide for their families. It gives added power either to read or to work as the mental drill which farmers' sons and daughters get usually comes by lamplight, this is no minor consideration. If in future electric lights can be provided for farm houses the girls will be relieved of the bugbear of cleaning sooty lamp chimneys and clogged oil burners.

The patent churn of the barrel variety lightens the labor of that back-breaking burden—churning. The cream separator is an invention even more important than this. However, there are few farm homes provided with either, for the cheapest and most primitive of methods and machinery are those which the farmer must use, because the income from the farm is very limited and it is only within the last few years that farmers are becoming prosperous. When the farmers' boys and girls have learned to make farming pay, then will these labor saving inventions be in use all over the land, and life, instead of being a struggle, will be easy sailing.

Some forty-five or fifty years ago some handy old man constructed the washboard, which was a considerable improvement upon washing with the hands. Now, you boys and girls are wondering what pleasure can be got out of a washboard. Not much I grant you; the pleasure consists in getting through with a disagreeable task. Now, washing machines are in use in many farm homes. They facilitate the work, do it with less labor, and more neatly than it was possible to do it in the old way. Why, some of the manufacturers would make you believe that turning a ball-bearing washing machine is just as pleasant as playing a piano.

The sewing machine is a great boon to women, enabling them to clothe themselves and families with less labor and more beautifully than could be done with the laborious finger work. If there is any one who finds little time to devote to dress it is the farmer's wife, although beauty is just as dear to her feminine heart as any other. Farmers' wives enjoy making and wearing pretty dresses a good deal more than they enjoy making butter and raising chickens and turkeys, though you would think from reading the farm journals that the latter was the farmer wife's heaven.

Now, I must tell you about the only invention on the farm on which I live. It is a slop barrel. It is fixed on two wheels and is much easier to carry slop or water to the hog pen than the 5-gallon can, which somebody usually has to empty about twice a day.

The phonograph, which can not be called a domestic invention, entertains many young people in the farm home. The telephone is fast becoming a necessity as a means of easy communication, and its uses far outweigh its abuses.

Now, I want just one other thing for every farm, and that is a windmill placed over a good well with pipes to run the water to where it is wanted. Then I think the boys and the girls and their mammas could have just the best time in the world, for there would not be so much to do and there would be time enough for them to drive around in the cool of the evening and rest during the heat of the day, and who could ask for more?

FLOWERS THE YEAR ROUND.

MRS. V. W. GRUBBS, Greenville.

"Consider the lilies how they grow. They toil not neither do they spin, yet I say unto you that Solomon in all his glory was not arrayed like one of them."

People differ very widely in the extent of their appreciation of flowers. Indeed, there are some who care nothing for them. I have met many persons during the few years I have devoted to the study and care of flowers, who, though above the average in point of general intelligence, did not know the difference between a carnation and chrysanthemum. Their lives had been given entirely to the study of business affairs; no time was taken to contemplate the surpassing beauty of the floral kingdom. What I shall have to say will be addressed specially to the flower lovers, for they alone can hope to succeed in the care and cultivation of flowers.

To have flowers in all seasons of the year, one must make necessary preparation. Those who are able to afford it, and the expense is not great, should provide a green house, large or small, and constructed to suit the plants to be cared for. Good soil should be provided. Carnations set in September or the middle of October at latest, and geraniums will prove fine winter bloomers. Roses may be kept in bloom continually by careful attention to the temperature. Then there are azaleas, begonias, pansies, allysiums, lilies, and others too numerous to mention.

If one can not afford a green house, a pit may be made at small expense, which with judicious management may be made to hold a large number of plants. Cover with glass or with cloth tacked to a frame. The frame should be well fitted and the cloth oiled to be translucent.

Bulbs give the amateur fine results. Take three or four hyacinths, Roman or Dutch, a jonquil, a narcissus, two or three crocus bulbs, snow drops, three tulips, an Easter lily, and a calla, border with oxalis, and I can promise you flowers all winter. However, these bulbs must be kept dark and moist until well sprouted. If you prefer, take one good rose, two geraniums, three carnations, and a few small plants. This much for the winter months. When spring arrives flowers should be cultivated in the open. Have a fine ever-blooming rose, beds of petunias, phlox, both hardy and annual, nasturtiums, cannas, and for background, sunflowers, hollyhocks and morning glories. All this will take some time, but just think how pretty a hedge of chrysanthemums will look when you are expecting frost. I know I haven't enumerated half that are favorites to you.

God in His wisdom gave us the flowers. He has planted them on the hillside and in the valley. The tiny violet grows in the shadow of the great magnolia; everywhere nature abounds in wild flowers. Let us have more of them and enjoy them as we should. It is not good to leave them off. There is no person whose nature can not be made sweeter and more cheerful through the influence of flowers, and with only a little effort you may have them all the year round.

WHAT A WOMAN CAN DO WITH CEMENT CONSTRUCTION ON THE FARM.

Mrs. E. M. Barrett, Austin.

Cement construction is only one more proof that there is nothing new under the sun; for more than 4000 years ago cement was used by the Egyptians in concrete construction. Two thousand years later the Romans used it extensively as a building material. The secret of its manufacture perished with the Romans and it was not till 1759 that it was rediscovered and revived in the erection of the famous Eddystone Light House in the English channel.

At present there are three grades of cement on the market, but I would advise the use of the best Portland only. First, Puzzlon cement, which is made from slag ground to a powder and is the cement used by the Romans and receives its name from the town, Puzzlon, at the foot of Mt. Vesuvius where the slag is obtained. Second, Roman cement is made by burning clayey limestone and grinding to a powder. This sets too quickly and crumbles with time. Third, Portland cement, which is burned at a very high temperature and then ground to a powder and mixed with 2 per cent plaster of paris. The Portland cement is made in America of a better quality than that of England, though a different kind of limestone is used in its production. Texas is especially rich in cement rock.

Not since the beginning of time has any building material come so quickly into popularity; it is used in a thousand ways not dreamed of by the Egyptians and Romans. It towers in the air, tunnels the earth and bars the progress of the sea. Its wonderful plastic qualities makes it possible to form the most artistic shapes in statuary, vases, garden furniture and pergolas, as well as the more useful walks, drives and buildings. In fact, there is no known use to which wood, brick or stone has been put that can not be replaced by cement to an advantage in cost and lasting qualities. For when a concrete building is completed the cost is completed; it needs no repairing, no repainting, no insurance; it is water proof, fire proof, time proof. We are truly in a cement age.

Concrete is the mixture of cement, sand and gravel in different proportions. For ordinary building blocks 1-3-5, and in case of cow sheds, pens or rock walls 1 to 12 or even as lean as 1 to 20.

Careful attention must be given to the sand. It must be clean and sharp. Any kind of gravel will do, though the crushed stone is best. The sand and cement must first be well mixed and then the gravel added; often the sand and gravel can be secured in the pits in about equal proportion and then mixed thoroughly, dampened till it leaves a ball in the hand when squeezed. Then well tamped and well cured, for a block well tamped and poorly cured, or well cured and poorly tamped, is equally bad. Curing means the process of keeping wet for at least three weeks after making to allow the cement to crystalize slowly and surely. On leaving the machine the block has no more strength than so much damp sand, but properly made, proportioned and properly cured the combined forces of the universe are as naught against it.

Machines for making concrete blocks are legion, some are good, some bad and some indifferent. The things to be careful about in a machine is to get a face down in order to use a thin mixture of rich face material for water proofing, at least expense, and a drop core. The hand pulled core is slow and laborious. These are the essentials for economy and speed. The little model here comes as near the "ideal" as one can get, being a face down machine, a drop core, and a convenient size 8x8x16 block. However, let none be discouraged because of lack of means to buy a machine or even cement for that matter for the slush system of concrete stones is older than the dry method. If you will pardon a little personal experience I will say that I have learned several things about concrete block making that I don't want to do again, and maybe more than I shall continue to do. First, I bought the wrong machine. Don't get a portable machine, and don't get a cheap machine unless it has no core; that is, an "L" or "T" shape will work in a cheap machine but none other. However, I succeeded in making good blocks from a hand-pulled core and sold the machine. These blocks cost me about 12 cents each. Then there came over me the longing to get back to the farm, as it does every one who has ever lived close to nature, and is nearing the great divide. I found the ideal garden spot, the garden of Eden,

but Adam and Eve had few ideas above fig leaves, and though I found mountains and dales, rivers and lakes, waterfalls and springs, shady groves and rippling brooks, yet there was naught to shelter man or beast except one rock house and a few pole pens. My cash was low and lumber high; rocks were plentiful even to incumbering the ground and I determined to build barns, cow barn, pig pen, all of those same rocks. I was told it could not be done, but when a woman wills she will, and you can depend on it. For cow barns that had to go up in a hurry I ordered a frame made with cedar posts cut from the nearby cedar brake, and covered with painted iron and then filled in between the posts with rocks and lime mortar all poured in a long box made of 1x12x16, and left twelve hours to dry and moved up for another course. The barn is to be built in the same way except there will be one part of cement to twelve of sand and mortar. This work the children can do and all the waste stones, bricks, or gravel can be built up in chicken houses, wal's, pens or what not. Even dwellings can be constructed in the same way and given a stucco or a spatter dash water proof coat. Gate posts, underpinning for houses, garden walls could be made by the children while at play.

Cost of concrete work all depends on labor, cost of sand, gravel and cement in different localities, but if you can't afford cement use lime, sand and stone. Take as your motto, "Build or bust."

VII. TEXAS DAIRYMEN'S ASSOCIATION.

CREAM SEPARATORS ON THE FARM.

B. D. CLEMENT.

The question of cream separators is a very broad one, as it reaches from Maine to California and from Texas to Alaska. They are being used in every State in the Union and like Texas it covers a great deal of ground. Before as intelligent an audience as we have here, it is not necessary to go into detail, for we have all seen hand separators, and most of us know what they will do, but some are a little skeptical whether it will pay or not to own one for four or five cows, but let me say right here that no one with that many cows can afford to do without a hand separator who owns that many that are milked. The separator is the first invention that has come to the aid of the dairyman, while we have seen all kinds of machinery to aid in the field work trying to save everything worth harvesting while milk is handled in the most wasteful manner, letting the calves or pigs have about one-fourth of the butter fat which they do not object to. But one thing we must remember, and that is the butter fed to them is worth just as much as that on the table, and most of us would think we were pretty rich if we thought we could afford to feed a one or two-pound roll of butter to the pigs every day, yet that is done where the milk is handled in the old way. The hand separator is here to take care of one of the most perishable products we have to deal with, saving its cost the first year with a few cows. Especially is this true in a country where they have long warm seasons. The cream separator is to the dairy what the binder is to the grain field, and more, as it is used twice a day the year through. You not only harvest every drop of cream, but the skim milk is worth more than twice what cold sour milk is, especially for feeding young calves. The hand separator leaves the skim milk in the best possible condition, even better than the skimming station, for doing your skimming at home, you then have the warm skim milk sweet and pure to feed and in just the way nature intended it, except the fat being removed which can be replaced by something cheaper like corn or oil meal. In skimming at home you have only the cream to cool down and care for, instead of handling the whole milk where you go to the skimming station having to make a trip every morning as compared with three or four times each week with the cream besides sometimes when you reach the skimming station you find night's milk sour and so thick it can not be separated at all, and, of course, that is lost entirely, butter fat and all, except its worth as a hog food and it is not worth even then as much as when fed warm and sweet from the separator.

Where you own a separator you are independent. You can skim early or late and no one can find fault because you did not get in on time so as not to keep them waiting. Besides if your stock is healthy, you keep them so by doing your skimming at home as you have no chance to get milk from outside herds. If it goes to a skimming station and there is a diseased herd in the neighborhood, each one that takes his milk there takes part of someone's else milk home, thus scattering it among all the patrons.

Some creameries pay 1 cent more per pound for butter fat in cream than for butter fat in milk, as it is an expense to run the large machines in a creamery and has to be met by some one. If you own your own separator, you can patronize the creamery where you are best satisfied. Now just a few words more if I have not already taken your patience to the limit, the separator is worth just as much to the farmer who is trying to make butter for his own use with a few pounds to spare occasionally as it is to the creamery patron. You get the same benefit, only in a different way, you make more butter, better butter, getting a better price for it, and can patronize a creamery if you wish and can use those leaky pans and milk crocks for something else. If you will ask any here present that have used a separator any length of time what they think about them, I believe they will all say I do not see how we could get along without one, as it is one of the most profitable tools on the farm.

CREAMERY VS. FARM BUTTER MAKING.

M. E. DETAR, Yoakum.

That I have been asked to prepare a paper on this subject, suggests to my mind the probability of a paper advocating the negative, and since this meeting will be the expose of minds that have spent years in the study of dairy business I shall be glad to listen to the paper on the opposite side and make the acquaintance of its author.

Perhaps the most important phase of this question in making a decision as to the side to champion is, which method will be of the greatest benefit to the greatest number of people.

Being a Kansan by birth, I have watched her affairs with more interest than those of other States. About twenty years ago three-fourths of her farms were under mortgage. Today more than three-fourths of her farmers have money in the banks. Near the time that so many farms were under mortgage creameries were being introduced by a company of promoters who were not careful in the selection of the proper country for dairying so long as they could get farmers' notes, and being in such strained circumstances made the farmer careless to the extent of another gamble, for it was a gamble to them, for few of them knew anthing of the creamery business. As a result most of them failed in a short time, but enough of them kept on their feet long enough to prove that there was money to be made that way, and today there is a creamery or skim station or cream shipping station at every village in the State. It is not my purpose to have you think that the creamery alone has put the Kansas farmer on his feet, but it has helped or they would not be so numerous today.

I do not know what the output of butter in that State is, but I am told by a man whose time is taken up with the creameries of that portion of the world that 25 per cent of the entire make is marketed in Texas. Why is this possible, when Texas is an older State by several years, and both of them adapted to agricultural pursuits?

If butter making on the farm could make dairying an industry, recognized because of its financial importance, would we be getting butter from a younger State, whose natural advantages in the way of climate are less than ours for the production of butter?

Those promoters of the creamery business in Kansas were better men than they knew. Certainly better than they have credit for. They gave the creamery a push in the start and it has not stopped yet.

I believe I made butter for the first co-operative creamery association in the State, but it did not co-operate very long, and some of the co-operators are cursing the promoters yet. That association was the means by which the attention of other parts of the State was attracted and thus put the creamery in a fair way to be introduced in places where it was needed.

Why is it that so few farmers are dairymen in a country or community where there is no creamery? Let us consider the conditions in a place where there is a creamery and it may give us some idea of its advantages.

First of all in importance to the creamery patrons is the butter maker whose whole time is taken up with the one theme—more butter and better butter. To the accomplishment of this end his study has included the selection of a dairy animal, the methods to pursue in breeding for a dairy cow, economical commercial feeds, feeds that may be raised profitably in different sections of the country. Added to this is a continuous study of the conditions in the place where he is employed.

Can you not see that as he sees each of his patrons several times every week, and because he is full of the one idea, that he is bound to talk with them about it until they become enthused, and get into the missionary work themselves? If I can get some of my patrons to discuss among themselves some of the ideas I have advanced, I am always sure of fruit. Hanging on will get the cream.

If the creamery happens to be in a small town there is a local pride in it because it is possibly the nearest approach to a manufacturing plant in the place and the merchants all talk about it, and the local paper helps it along. After a while people who have raised cotton all their lives begin to notice some of these things, and listen to his neighbor-dairyman's monthly check. That is the thing that does the talking to some people. We have a patron who made butter for twelve years before the creamery was built. His butter was of good quality and he got a good price, but he says he would not be bothered with making butter again. His net profit last year was over $1400.

In conclusion, let me say that there are many reasons why farm butter making can not reach the plane of importance to the State as well as to the farmer that the creamery has in States where it was introduced earlier.

Among them is the quality of the butter. Our creamery only has ninety-three patrons, but on account of the different conditions and experience, we would probably have ninety-three different kinds of butter if it was all made on the farm.

APPENDIX.

LIST OF BULLETINS FOR FARMERS.

I. TEXAS DEPARTMENT OF AGRICULTURE.

The Texas Departmnt of Agriculture has issued the Bulletins listed below. Copies of these Bulletins may be had free of cost by application to the Commissioner of Agriculture, Austin, Texas.

1. Third Annual Report of the Inspector of Orchards and Nurseries, 1907.
2. Pecans and Other Nuts in Texas.
3. Papers and Addresses before the Tenth Annual Session of the Texas Farmers' Congress, 1907.
4. Corn Culture. (In preparation.)

II. TEXAS AGRICULTURAL EXPERIMENT STATIONS.

Below is a list, by number, of the bulletins issued since the beginning, in March, 1888. Copies of such bulletins as are in stock may be had free of cost by applying to the Director, Agricultural Experiment Stations, College Station, Texas.

1. Plan of Organization. Pp. 4.
2. Experiments Started. Pp. 14.
3. Grasses. Pp. 14.
4. Root Rot of Cotton, or Cotton Blight.
5. Creameries in Texas. Pp. 24.
6. Feeding Experiment. Pp. 39.
7. Cotton Root Rot. Pp. 35.
8. Work in Horticulture. Pp. 39.
9. Pear Stocks. Some Parasitic Fungi of Texas. Pp. 29.
10. Feeding Experiment. Pp. 31.
11. Effect of Cotton Seed and Cotton Seed Meal on Butter Product. Pp. 16.
12. The Screw Worm. Pp. 7.
13. Sorghum: Value as a Feed Stuff; Effect on Soil. Teosinte: Analyses at Different Stages of Growth. Pp. 14.
14. Effect of Cotton Seed and Cotton Seed Meal in the Dairy Ration on Gravity and Centrifugal Creaming of Milk. Pp. 15.
15. Influence of Climate on Composition of Corn. Digestibility of Southern Feed Stuffs: Cotton Seed Hulls; Corn Fodder. Ash Analyses. Roasted Cotton Seed. Pp. 16.
16. Work in Horticulture. Drainage Experiments: Irish Potatoes, Cabbage, Strawberries. Russian Fruits and Ornamental Trees. List of Fruits on Trial. Forest Trees Successful to Date. Pp. 15.
17. General Information Relating to the Texas Agricultural Experiment Station. Pp. 16.
18. Liver Flukes: The Common Fluke. A New Species. Pp. 10, Pls. VIII.
19. Corn Fodder: Methods of Saving; Cost; Digestibility and Value. Pp. 9.
20. Grasses and Forage Plants; A Study of Composition and Value. Texas Grains; Composition. Ash Analyses, Grasses and Grains. Pp. 14.
21. Effect of Cotton Seed and Cotton Seed Meal in Feeding Hogs. Pp. 16.
22. Alfalfa Root Rot. Pp. 8.
23. Black Rot of the Grape: Life History; Treatment. Pp. 15.
24. The Cattle Tick: Biology: Preventive Measures. Pp. 24.
25. Texas Soils: A Study of Chemical Composition. Pp. 16.
26. Cost of Cotton Production and Profit Per Acre. Pp. 310.
27. Steer Feeding.
28. Sweet Potatoes. Pp. 20.
29. Effects of Cotton Seed and Cotton Seed Meal on Butter, Beef, Tallow, Lard and Sheet Suet. Pp. 10.

30. Veterinary Science: I. Glanders Experiments. II. Tuberculine Experiments. III. Lump Jaw of Cattle. IV. Notes on Parasites. V. Texas Fever Experiments. VI. Device for Destroying Ticks. Pp. 22.
31. Insects Injurious to Stored Grain. Pp. 10.
32. I. Varieties of Plums. II. Injurious Fungi Insects. III. Varieties of Apricots. IV. Varieties of Japan Persimmons. Pp. 24.
33. Feeding Milk Cows. Pp. 24.
34. Field Experiments at McKinney Sub-Station and Wichita Falls Sub-Station with Wheat, Corn, Cotton, Grasses and Manures. Field Experiments at College Station with Corn, Cotton, Grasses, Peas and Manures. Pp. 72.
35. Miscellaneous Analyses. Pp. 11.
36. Vegetables: Varieties of Sweet Potatoes, Onions, Melons, Celery, Beans, Cabbage, Cauliflower and Tomatoes. Insecticides. Pp. 44.
37. Sundry Brief Articles Compiled from "Press Notes" Published during the Years 1894 and 1895. Pp. 86.
38. Canaigre, the New Tanning Plant. Pp. 10.
39. The Peach. Pp. 50.
40. Corn, Cotton and Forage Crops.
41. Steer Feeding.
42. The Irish Potato. Pp. 16.
43. Report from Beeville Station: I. Soils. II. Climate. III. Water Supply. IV. Irrigation Equipment. Pp. 32.
44. Paints and Painting Materials and Miscellaneous Analyses. Pp. 14.
45. Cotton Experiments: Fertilizers; Varieties; Distance. Corn Experiments. Pp. 34.
46. Grasses and Forage Plants. Pp. 22.
47. The Effect of Food on Economic Dairy Products. Pp. 76.
48. The Grape. Pp. 32.
49. I. Corn Experiments: II. Best Varieties of Corn.
50. Cotton Experiments: Varieties; Distance; Fertilizers. Pp. 21.
51. Fertilizers and Fertilizer Analyses. Pp. 15.
52. Report of Beeville Station on Cabbage and Cauliflower. Pp. 11.
53. Texas Fever. Pp. 54.
54. The Irish Potato. Pp. 22.
55. I. Feeding Steers. II. Feed Value of Cotton Seed and Its Products. Pp. 86.
56. Investigation and Improvement of American Grapes. Pp. 70.
57. Report of Beeville Station: Cabbage: Fertilizers, Varieties, Shipping. Cauliflower: Varieties, Shipping. Pp. 24.
58. Pruning and Training Peach Orchards. Pp. 18.
59. Forage Crops. Reports of Co-operating Stockmen and Farmers from 71 Counties. Alfalfa; Japan Clover; Melilotus; Crimson Crover; White Clover; Velvet Bean; Beggar Weed; Cow Peas; Rescue Grass; Kaffir Corn; Field Corn; Chufas. Pp. 56.
60. Onion Growing, Two Methods of. Pp. 14.
61. Tobacco Soils at Willis and Huntsville. Pp. 14.
62. The Fig. Pp. 16.
63. Texas Fever. Pp. 60.
64. Insect Pests Attacking Truck Crops. Pp. 17.
65. The Tomato. Pp. 31.
66. Alfalfa; Peanuts; Velvet Beans; Millet; Rape. Pp. 16.
67. Commercial Fertilizers and Commercial Poisonous Insecticides. Pp. 14.
68. The Manufacture of Cane Syrup. Pp. 13, Figs. 12.
69. Cabbage: Varieties; Fertilizers. Pp. 28.
70. The Composition of Texas Cotton Seed Meal. Pp. 15.
71. Irish Potatoes. Pp. 16.
72. Strawberries at Troupe Station. Pp. 15.
73. The Composition of Rice By-Products. Pp. 14.
74. Insects Mistaken for the Mexican Cotton Boll Weevil. Pp. 13.
75. Cotton Investigations of the Bureau of Plant Industry of the U. S. Department of Agriculture and the Texas Experiment Station. Early Cottons. Pp. 20.

76. Experiments in Steer Feeding. I. Rice By-Products for Steer Feeding. II. Fodders for Feeding Steers with Cotton Seed Meal. III. Molasses for Steer Feeding. IV. Comparison of Yearlings with Two-Year-Olds for Fattening. V. Corn vs. Corn and Cotton Seed Meal for Steers on Pasture. Pp. 23.
77. Onions and Bunch Crops at Beeville. I. Onions. II. Beets. III. Radishes. IV. Lettuce. V. Carrots and Turnips. Pp. 28.
78. Feeding Fermented Cotton Seed Meal to Hogs. Pp. 20.
79. Cotton Breeding of the Bureau of Plant Industry, U. S. Department of Agriculture and the Texas Experiment Station. Pp. 9.
80. Peach Growing in Texas. Pp. 29.
81. Alfalfa Seed Testing. Pp. 15.
82. Maintaining the Fertility of Rice Soils; A Chemical Study. Pp. 42.
83. Nitro-Culture. Pp. 15.
84 Tomato Fertilizers at Troupe. Pp. 15.
85. Commercial Fertilizers in 1905-1906. Pp. 20.
86. Cattle Feeding Experiments. I. Molasses for Fattening Cattle. II. Rough Rice as Steer Feed. III. Profit from Different Systems of Feeding Cattle. Pp. 23.
87. The San Jose Scale. Pp. 11.
88. Length of Life of Vines of Various Species and Varieties of Grapes; Profitableness, and by What Diseases Seriously Affected. Pp. 8, Pls. 9.
89. Insects of the Garden. Pp. 52.
90. Feed Control Bulletin.
91. Food Adulteration in Texas.
92. A Test of the Producing Power of Some Seed Corn in Texas.
93. The Sweet Potato Borer. Pp. 16.
94. Horticultural Survey of the Gulf Coast. Pp. 21.
95. Information Regarding the New Feed Law. Pp. 24.
96. Commercial Fertilizers and Poisonous Insecticides, 1906-1907.
97. Kaffir Corn and Milo Maize for Fattening Cattle. Pp. 20.
98. Summary: Texas Bulletins Nos. 1 to 94, inclusive. Pp. 97.
99. The Composition and Properties of Some Texas Soils. Pp. 50.
100. The Chemical Composition of Some Texas Soils. Pp. 8.
101. Irish Potato Fertilizer Experiments. Pp. 11.
102. Texas Honey Plants.

In order that you may receive future issues of bulletins from the Texas Agricultural Experimental Station, ask the Director, College Station, Texas, to place your name on the mailing list.

III. FARMERS' BULLETINS ISSUED BY THE DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

The following is a list, by number, of the Farmers' Bulletins available for distribution. The bulletins entitled "Experiment Station Work" give in brief the results of experiments performed by the State Experiment Stations. Bulletins will be sent free to any address in the United States on application to a Senator, Representative or to the Secretary of Agriculture, Washington, D. C. Numbers omitted have been discontinued, being superseded by later bulletins.

22. The Feeding of Farm Animals. Pp. 40.
24. Hog Cholera and Swine Plague. Pp. 16.
25. Peanuts: Culture and Uses. Pp. 24.
27. Flax for Seed and Fiber. Pp. 16.
28. Weeds and How to Kill Them. Pp. 30.
29. Souring and Other Changes in Milk. Pp. 22.
30. Grape Diseases on the Pacific Coast. Pp. 15.
32. Silos and Silage. Pp. 30.
33. Peach Growing for Market. Pp. 24.
34. Meats: Composition and Cooking. Pp. 31.
35. Potato Culture. Pp. 24.
36. Cotton Seed and Its Products. Pp. 16.
39. Onion Culture. Pp. 30.
41. Fowls: Care and Feeding. Pp. 24.

42. Facts About Milk. Pp. 32.
44. Commercial Fertilizers. Pp. 38.
46. Irrigation in Humid Climates. Pp. 27.
47. Insects Affecting the Cotton Plant. Pp. 32.
48. The Manuring of Cotton. Pp. 16.
49. Sheep Feeding. Pp. 24.
51. Standard Varieties of Chickens. Pp. 48.
52. The Sugar Beet. Pp. 48.
54. Some Common Birds. Pp. 48.
55. The Dairy Herd. Pp. 30.
56. Experiment Station Work—I. Pp. 30.
58. The Soy Bean as a Forage Crop. Pp. 24.
59. Bee Keeping. Pp. 48.
60. Methods of Curing Tobacco. Pp. 24.
61. Asparagus Culture. Pp. 40.
62. Marketing Farm Produce. Pp. 31.
63. Care of Milk on the Farm. Pp. 40.
64. Ducks and Geese. Pp. 55.
65. Experiment Station Work—II. Pp. 32.
66. Meadows and Pastures. Pp. 30.
68. The Black Rot of the Cabbage. Pp. 22.
69. Experiment Station Work—III. Pp. 32.
70. Insect Enemies of the Grape. Pp. 23.
71. Essentials in Beef Production. Pp. 24.
72. Cattle Ranges of the Southwest. Pp. 32.
73. Experiment Station Work—IV. Pp. 32.
74. Milk as Food. Pp. 39.
77. The Liming of Soils. Pp. 24.
78. Experiment Station Work—V. Pp. 32.
79. Experiment Station Work—VI. Pp. 27.
80. The Peach Twig Borer. Pp. 16.
81. Corn Culture in the South. Pp. 24.
82. The Culture of Tobacco. Pp. 22.
83. Tobacco Soils. Pp. 23.
84. Experiment Station Work—VII. Pp. 32.
85. Fish as Food. Pp. 32.
86. Thirty Poisonous Plants. Pp. 32.
87. Experiment Station Work—VIII. Pp. 32.
88. Alkali Lands. Pp. 23.
91. Potato Diseases and Treatment. Pp. 15.
92. Experiment Station Work—IX. Pp. 30.
93. Sugar as Food. Pp. 31.
95. Good Roads for Farmers. Pp. 46.
96. Raising Sheep for Mutton. Pp. 48.
97. Experiment Station Work—X. Pp. 32.
98. Suggestions to Southern Farmers. Pp. 48.
99. Insect Enemies of Shade Trees. Pp. 30.
100. Hog Raising in the South. Pp. 40.
101. Millets. Pp. 30.
102. Southern Forage Plants. Pp. 48.
103. Experiment Station Work—XI. Pp. 30.
104. Notes on Frost. Pp. 24.
105. Experiment Station Work—XII. Pp. 32.
106. Breeds of Dairy Cattle. Pp. 48.
107. Experiment Station Work—XIII. Pp. 32.
108. Saltbushes. Pp. 20.
109. Farmers' Reading Courses. Pp. 20.
110. Rice Culture in the United States. Pp. 28.
111. Farmers' Interest in Good Seed. Pp. 24.
112. Bread and Bread Making. Pp. 40.
113. The Apple and How to Grow It. Pp. 32.
114. Experiment Station Work—XIV. Pp. 28.
115. Hop Culture in California. Pp. 28.

116. Irrigation in Fruit Growing. Pp. 48.
118. Grape Growing in the South. Pp. 32.
119. Experiment Station Work—XV. Pp. 30.
120. Insects Affecting Tobacco. Pp. 32.
121. Beans, Peas and Other Legumes as Food. Pp. 38.
122. Experiment Station Work—XVI. Pp. 32.
124. Experiment Station Work—XVII. Pp. 32.
125. Protection of Food Products from Injurious Temperatures. Pp. 24.
126. Practical Suggestions for Farm Buildings. Pp. 48.
127. Important Insecticides. Pp. 46.
128. Eggs and Their Uses as Food. Pp. 40.
129. Sweet Potatoes. Pp. 40.
131. Household Tests for Detection of Oleomargarine and Renovated Butter. Pp. 10.
132. Insect Enemies of Growing Wheat. Pp. 38.
133. Experiment Station Work—XVIII. Pp. 32.
134. Tree Planting in Rural School Grounds. Pp. 32.
135. Sorghum Sirup Manufacture. Pp. 40.
136. Earth Roads. Pp. 24.
137. The Angora Goat. Pp. 48.
138. Irrigation in Field and Garden. Pp. 40.
139. Emmer: A Grain for the Semi-arid Regions. Pp. 16.
140. Pineapple Growing. Pp. 48.
141. Poultry Raising on the Farm. Pp. 16.
142. Principles of Nutrition and Nutritive Value of Food. Pp. 48.
143. Conformation of Beef and Dairy Cattle. Pp. 44.
144. Experiment Station Work—XIX. Pp. 32.
145. Carbon Bisulphid as an Insecticide. Pp. 28.
146. Insecticides and Fungicides. Pp. 16.
147. Winter Forage Crops for the South. Pp. 40.
149. Experiment Station Work—XX. Pp. 32.
150. Clearing New Land. Pp. 24.
151. Dairying in the South. Pp. 48.
152. Scabies in Cattle. Pp. 32.
153. Orchard Enemies in the Pacific Northwest. Pp. 39.
154. The Home Fruit Garden: Preparation and Care. Pp. 16.
155. How Insects Affect Health in Rural Districts. Pp. 19.
156. The Home Vineyard. Pp. 22.
157. The Propagation of Plants. Pp. 24.
158. How to Build Small Irrigation Ditches. Pp. 28.
159. Scab in Sheep. Pp. 48.
161. Practical Suggestions for Fruit Growers. Pp. 30.
162. Experiment Station Work—XXI. Pp. 32.
164. Rape as a Forage Crop. Pp. 16.
165. Silkworm Culture. Pp. 32.
166. Cheese Making on the Farm. Pp. 16.
167. Cassava. Pp. 32.
168. Pearl Millet. Pp. 16.
169. Experiment Station Work—XXII. Pp. 32.
170. Principles of Horse Feeding. Pp. 44.
172. Scale Insects and Mites on Citrus Trees. Pp. 43.
173. Primer of Forestry. Pp. 48.
174. Broom Corn. Pp. 30.
175. Home Manufacture and Use of Unfermented Grape Juice. Pp. 16.
176. Cranberry Culture. Pp. 20.
177. Squab Raising. Pp. 32.
178. Insects Injurious in Cranberry Culture. Pp. 32.
179. Horseshoeing. Pp. 30.
181. Pruning. Pp. 39.
182. Poultry as Food. Pp. 40.
183. Meat on the Farm: Butchering, Curing and Keeping. Pp. 37.
184. Marketing Live Stock. Pp. 40.
185. Beautifying the Home Grounds. Pp. 24.

186. Experiment Station Work—XXIII. Pp. 32.
187. Drainage of Farm Lands. Pp. 38.
188. Weeds Used in Medicine. Pp. 45.
190. Experiment Station Work—XXIV. Pp. 32.
192. Barnyard Manure. Pp. 32.
193. Experiment Station Work—XXV. Pp. 32.
194. Alfalfa Seed. Pp. 14.
195. Annual Flowering Plants. Pp. 48.
196. Usefulness of the American Toad. Pp. 16.
197. Importation of Game Birds and Eggs for Propagation. Pp. 30.
198. Strawberries. Pp. 24.
199. Corn Growing. Pp. 32.
200. Turkeys. Pp. 40.
201. Cream Separator on Western Farms. Pp. 23.
202. Experiment Station Work—XXVI. Pp. 32.
203. Canned Fruits, Preserves and Jellies. Pp. 32.
204. The Cultivation of Mushrooms. Pp. 24.
205. Pig Management. Pp. 40.
206. Milk Fever and Its Treatment. Pp. 16.
208. Varieties of Fruits Recommended for Planting. Pp. 48.
209. Controlling the Boll Weevil in Cotton Seed and at Ginneries. Pp. 32.
210. Experiment Station Work—XXVII. Pp. 32.
211. The Use of Paris Green in Controlling the Cotton Boll Weevil. Pp. 23.
213. Raspberries. Pp. 38.
215. Alfalfa Growing. Pp. 40.
216. The Control of the Boll Weevil. Pp. 32.
217. Essential Steps in Securing an Early Crop of Cotton. Pp. 16.
218. The School Garden. Pp. 40.
219. Lessons from the Grain Rust Epidemic of 1904. Pp. 24.
220. Tomatoes. Pp. 32.
221. Fungus Diseases of the Cranberry. Pp. 16.
222. Experiment Station Work—XXVIII. Pp. 32.
223. Miscellaneous Cotton Insects in Texas. Pp. 24.
224. Canadian Field Peas. Pp. 16.
225. Experiment Station Work—XXIX. Pp. 32.
226. Relation of Coyotes to Stock Raising in the West. Pp. 24.
227. Experiment Station Work—XXX. Pp. 32.
228. Forest Planting and Farm Management. Pp. 22.
229. The Production of Good Seed Corn. Pp. 24.
231. Srpaying for Cucumber and Melon Diseases. Pp. 24.
232. Okra: Its Culture and Uses. Pp. 16.
233. Experiment Station Work—XXXI. Pp. 32.
234. The Guinea Fowl. Pp. 24.
235. Preparation of Cement Concrete. Pp. 32.
236. Incubation and Incubators. Pp. 32.
237. Experiment Station Work—XXXII. Pp. 32.
238. Citrus Fruit Growing in the Gulf States. Pp. 48.
239. The Corrosion of Fence Wire. Pp. 32.
240. Inoculation of Legumes. Pp. 8.
241. Butter Making on the Farm. Pp. 32.
242. An Example of Model Farming. Pp. 16.
243. Fungicides and Their Use in Preventing Diseases of Fruits. Pp. 32.
244. Experiment Station Work—XXXIII. Pp. 32.
245. Renovation of Worn-out Soils. Pp. 16.
246. Saccharine Sorghums for Forage. Pp. 37.
247. The Control of the Codling Moth and Apple Scab. Pp. 21.
248. The Lawn. Pp. 20.
249. Cereal Breakfast Foods. Pp. 36.
250. The Prevention of Wheat Smut and Loose Smut of Oats. Pp. 16.
251. Experiment Station Work—XXXIV. Pp. 32.
252. Maple Sugar and Sirup. Pp. 36.
253. The Germination of Seed Corn. Pp. 16.
254. Cucumbers. Pp. 30.

255. The Home Vegetable Garden. Pp. 47.
256. Preparation of Vegetables for the Table. Pp. 48.
257. Soil Fertility. Pp. 39.
258. Texas or Tick Fever and Its Prevention. Pp. 45.
259. Experiment Station Work—XXXV. Pp. 32.
260. Seed of Red Clover and Its Impurities. Pp. 24.
261. The Cattle Tick. Pp. 22.
262. Experiment Station Work—XXXVI. Pp. 32.
263. Practical Information for Beginners in Irrigation. Pp. 40.
264. The Brown-tail Moth and How to Control It. Pp. 22.
265. Game Laws for 1906. Pp. 54.
266. Management of Soils to Conserve Moisture. Pp. 30.
267. Experiment Station Work—XXXVII. Pp. 32.
268. Industrial Alcohol: Sources and Manufacture. Pp. 45.
269. Industrial Alcohol: Uses and Statistics. Pp. 29.
270. Modern Conveniences for the Farm Home. Pp. 48.
271. Forage Crop Practices in Western Oregon and Western Washington Pp. 39.
272. A Successful Hog and Seed-Corn Farm. Pp. 16.
273. Experiment Station Work—XXXVIII. Pp. 32.
274. Flax Culture. Pp. 36.
275. The Gipsy Moth and How to Control It. Pp. 22.
276. Experiment Station Work—XXXIX. Pp. 32.
277. The Use of Alcohol and Gasoline in Farm Engines. Pp. 40.
278. Leguminous Crops for Green Manuring. Pp. 27.
279. A Method of Eradicating Johnson Grass. Pp. 16.
280. A Profitable Tenant Dairy Farm. Pp. 16.
281. Experiment Station Work—XL. Pp. 32.
282. Celery. Pp. 36.
283. Spraying for Apple Diseases and the Codling Moth in the Ozarks. Pp. 42.
284. Insect and Fungus Enemies of the Grape East of the Rocky Mountains. Pp. 48.
285. The Advantage of Planting Heavy Cotton Seed. Pp. 16.
286. Comparative Value of Whole Cotton Seed and Cotton Seed Meal in Fertilizing Cotton. Pp. 14.
287. Poultry Management.
288. Non-saccharine Sorghums. Pp. 28.
289. Beans. Pp. 28.
290. The Cotton Bollworm. Pp. 32.
291. Evaporation of Apples. Pp. 38.
292. Cost of Filling Silos. Pp. 15.
293. Use of Fruit as Food. Pp. 38.
294. Farm Practice in the Columbia Basin Uplands.
295. Potatoes and Other Root Crops as Food.
296. Experiment Station Work—XLI.
297. Method of Destroying Rats.
298. The Food Value of Indian Corn and Corn Products.
299. Diversified Farming under the Plantation System. Pp. 14.
300. Some Important Grasses and Forage Plants for the Gulf Coast Region. Pp. 15.
301. Home Grown Tea. Pp. 16.
302. Sea Island Cotton: Its Culture, Improvement and Diseases. Pp. 48.
303. Corn Harvesting Machinery. Pp. 32.
304. Growing and Curing Hops. Pp. 30.
305. Experiment Station Work—XLII. Pp. 32.
306. Dodder in Relation to Farm Seeds. Pp. 27.
307. Roselle: Its Culture and Uses. Pp. 16.
308. Game Laws for 1907. Pp. 52.
309. Experiment Station Work—XLIII. Pp. 32.
310. A Successful Alabama Diversification Farm. Pp. 24.
311. Sand-Clay and Burnt-Clay Roads. Pp. 19.
312. A Successful Southern Hay Farm. Pp. 16.
313. Harvesting and Storing Corn. Pp. 32.

314. A Method of Breeding Early Cotton to Escape Boll Weevil Damage. Pp. 20.
315. Progress in Legume Inoculation. Pp. 20.
316. Experiment Station Work—XLIV. Pp. 32.
317. Experiment Station Work—XLV. Pp. 32.
318. Cowpeas. Pp. 26.
319. Demonstration Work in Co-operation with Southern Farmers. Pp. 22.
320. Experiment Station Work—XLVI. Pp. 32.
321. The Use of the Split-Log Drag on Earth Roads. Pp. 14.
322. Milo as a Dry-Land Grain Crop. Pp. 23.
323. Farming on the Sandy Jack-Pine Lands. Pp. 24.
324. Sweet Potatoes. Pp. 40.
325. Small Farms in the Corn Belt. Pp. 30.
326. Building up a Run-Down Cotton Plantation. Pp. 22.
327. The Conservation of Natural Resources. Pp. 12.

NOTE.—The "Index to Farmers' Bulletins" prepared by the Division of Publications, U. S. Department of Agriculture, will prove very helpful to every one who uses this series of Farmers' Bulletins.

In order that you may know the titles of bulletins to be issued hereafter by the United States Department of Agriculture, ask the Secretary of Agriculture, Washington, D. C., to send you the "Monthly List of Publications."

IV. SOIL SURVEYS.

A good many inquiries are received at this office in regard to Texas soils. The Texas Department of Agriculture has no soil map of Texas for distribution. The Bureau of Soils of the U. S. Department of Agriculture has mapped the following areas in Texas. These surveys, usually constituting a pamphlet of about thirty pages and a map, may be had by applying to your Congressman or to the Secretary of Agriculture, Washington, D. C.

Title.	Area in Sq. Miles.	Date.
Soil Survey of Anderson County, Texas	1,068.6	1904
Soil Survey of Austin Area, Texas	705.0	1904
Soil Survey of Bastrop County, Texas (in press)	921.0	1907
Soil Survey of Brazoria Area, Texas	845.0	1902
Soil Survey of Brownsville Area, Texas (in press)	211.7	1907
Soil Survey of Corpus Christi Area (in progress).		
Soil Survey of Delta and Lamar Counties (in press)	625.4	1907
Soil Survey of Franklin, Titus and Camp Counties (in progress).		
Soil Survey of Henderson Area, Texas	581.3	1906
Soil Survey of Houston County, Texas	1,191.8	1906
Soil Survey of Jacksonville Area, Texas	100.0	1903
Soil Survey of Laredo Area, Texas	155.5	1906
Soil Survey of Lavaca County, Texas	995.0	1905
Soil Survey of Lee County, Texas	665.8	1905
Soil Survey of Lufkin Area, Texas	99.0	1903
Soil Survey of Nacogdoches Area, Texas	97.2	1903
Soil Survey of Paris Area, Texas	547.6	1903
Soil Survey of Robertson County, Texas (in press)	913.0	1907
Soil Survey of San Antonio Area, Texas	484.4	1904
Soil Survey of San Marcos Area, Texas	515.1	1906
Soil Survey of Vernon Area, Texas	276.8	1902
Soil Survey of Waco Area, Texas	495.1	1905
Soil Survey of Willis Area, Texas	215.0	1901
Soil Survey of Wilson County, Texas	783.3	1907
Soil Survey of Woodville Area, Texas	100.0	1903

INDEX.

Advertising by the farmer pays, 12, 13; how to advertise, 115.

Agriculture—
  dominant interest in Texas, 15; economic relations of birds and mammals to, 32.

Agriculture in the schools—
  taught in public schools, 18, 19, 35; as taught at the A. and M. College, 116-118.

Agricultural high schools—
  in Georgia, 20, 26; in Minnesota, 26; in Wisconsin, 26; in Nebraska, 26; how to be conducted, 26, 27; should form a part of our educational system, 26.

Agricultural and Mechanical College—
  separated by gulf from common schools 20; what it stands for, 16, 25; good record of its graduates, 16; more graduates demanded, 16, 25; some of the schools' needs, 16, 35; proper meeting place for Farmers' Congress, 20; scientific stock farming taught there, 116-118.

Agricultural products, value of those raised in Texas, 15.

Alfalfa—
  grown on sandy land after peas, 56; curing alfalfa hay, 58; alfalfa and Johnson grass, 94, 95; as green pasture for pigs, 97; as a pork producer, 101-107, 113.

Arsenate of lead as an insecticide, 88.

Bananas grown in Texas, 43.

Barnyard manure, uses of, 69.

Bees, different races, 120 121.

Beekeeping—
  Requisites to success, 119; location of apiary, 119; best bees, 120; importance of good queens, 121; requeening, 121, 122; homemade hives, 122, 123; controlling swarming, 123; managing out-apiaries, 125, 126; handling without stinging, 127; queen rearing, 132, 133; foul brood control, 133, 134.

Bee sting, remedy for, 135.

Beeswax, how produced, 126, 127.

Biological Survey—
  its work in Texas endorsed, 28; publications of, 28; helps to protect useful birds and animals, 39, 40.

Birds of Texas—
  food habits, 28; eat boll weevil, 28; should be protected, 28, 36-40.

Boll weevil—
  cotton that will escape, 22, 23; eaten by certain birds, 28.

Boll worm (see "cotton boll worm.")

Bookkeeping necessary to the farmer, 77.

Boys—
  reason for leaving the farm, 23; educated away from the farm, 24, 25; how to keep them on the farm, 23-26; teach them to love the farm, 42.

Butter—
  improved by use of cream separator, 142; creamery vs. farm butter, 143, 144; butter shipped into Texas, 143.

Cement construction on the farm, 140, 141.

Check-rowing, advantages of, 70.

Cockleburrs poison hogs, 82, 98.

Corn—
  cost of growing an acre of corn, 76-78; yield can be increased without increasing the cost of production, 51, 78; peas increase productivity of soil, 59; raising cheaper than importing, 73; soil suited to corn, 52-56; chief peculiarities of good corn soils, 53-55; where deep plowing is necessary, 54, 59, 60; quantity of soil moisture required, 54; importance of drainage, 54; variety should suit locality, 55; variation of corn in different latitudes, 66-68; test of Northern corn in Texas, 61; test of native corn, 62; native varieties best, 53, 61, 62, 66-68; low yield due to inferior seed, 61, 62; selecting ears of quality for seed, 60-65; characteristics of a good stalk, 63, 84; characteristics of a good ear, 63, 64, 84; difference in yielding power of separate ears, 61, 64; importance of shelling record in seed corn, 65, 66; judging corn, 83-85; selling corn by grade, 78; corn prices likely to remain high in Texas, 79; tillage of corn, 69-73; stand is affected by preparation of seed bed, 59; plowing, 69; manuring, 69, 70; planting, 70; cultivation, 70-75; check-rowing, 70; corn insects, 88, 89.

Corn growing and stock farming, 79, 80.

Corn exhibitions—
how to prepare corn, 82, 83; use of exhibitions, 82, 83, 85; boys should make exhibits, 86.

Corn Growers' Association, how to increase its usefulness, 84-87.

Corn gospel train—
favored, 27, 86, 87; good results where employed, 84, 86.

Cotton—
characteristics of ideal variety, 22, 23; yield increased by cultivation of peas, 59; should be made a "surplus money crop," 73; warehouses, 15.

Cotton boll worm, how destroyed, 89.

Cottonseed meal, as a profitable hog feed, 108, 109.

Crates, Texas made crates criticised, 14.

Cream separators on the farm, advantages of, 142, 143.

Creamery vs. farm butter making, 143, 144.

Crop zones, their relation to natural life zones, 28.

Cultivator, large or small shovels, which, 72.

Dairying in Texas black land region, 80.

Dallas fair, prizes offered for corn, 83.

Department of Agriculture—
its creation demanded by Farmers' Congress, 17, 35, 36; support pledged to it by Farmers' Congress, 18, 27, 28; asked to inaugurate farmers' institutes, 32; policy outlined, 41.

Dipping hogs, 114.

Diversification needed to make Texas more prosperous, 73. 74.

Domestic economy in the farmers' institute, 42.

Drainage, importance of, 54, 55.

Education—
system of education for rural schools wrong, 24; provision should be made for agricultural high schools, 26; Farmers' Congress an advocate of education, 18-21; report of committee on education, 30-32; education in Texas has not kept pace with progress in industrial lines, 31; line of advance recommended, 31, 32.

Evergreens, native, 45, 46.

Exhibits of farm products at Farmers' Congress, 43; corn exhibits in general, 82, 83, 85, 86; hogs in the show ring, 116.

Express companies criticised, 14.

Farm—
number of farms in Texas, 17; products of Texas farms, 21.

Farm home—
flowers for, 139; modern conveniences for, 136-138.

Farm life, inventions that have added to pleasures of, 138, 139.

Farm management, office, will aid farmers, 82.

Farmer—
tribute to, 41, 42; the young farmer, 51; examples of successful farming, 24; income, 23, 24.

Farmers' Congress—
sketch of its history, 15, 19, 20; what it has accomplished, 17, 36; printing the proceedings, 29, 30.

Farmers' institutes, endorsed by Farmers' Congress, 29.

Farmers' Union, co-operation with Farmers' Congress, 18, 33, 36.

Fertility—
fertility of land restored by peas, 56; livestock necessary to maintain fertility, 79.

Flowers the year 'round, 139.

Flowering shrubs, native, 45-47.

Forest destruction, 36, 37.

Foul brood, control of, 133, 134.

Fruit failure of 1907, 44.

Gambling in futures forbidden, 35.

Girls, teach them to be homemakers, 136.

Goobers (see "peanuts.")

Grain—
why grown in Texas, 73, 74; use of grain in a rational farming system, 80. 81; grain in Southwest Texas, 90.

Grange, Texas State, co-operation with Farmers' Congress, 18, 33.

Granulation of honey—
most honey will granulate, 128, 129; to liquify it should not be boiled, 129, 130; heating to 152 degrees retards granulation without injuring flavor, 129, 130, 131; granulation discouraging to dealers, 130, 131.

Green bug, 89, 90, and chances for its recurrence, 90-92.

Green pasture for hogs—
wheat, goobers, and oats, 81; alfalfa, 97, 101-107; value of green pasture underestimated, 100, 101; green pasture alone insufficient, 100, 101, 113; establishing a pasture, 107.

Harrow most economical tool for destroying young weeds, 70.

Hives for bees—
made at home, 122, 123; advantages of shallow divisible hives and supers, 123-125.

Hoe, most expensive tool on the farm, 70.

Hogs—
cost of equipping a 40-acre hog farm, 113, 114; most profitable farm product, 113; demand greater than the supply, 111, 112; one pig to every four acres in Iowa and to every 15 acres in black land region of Texas, 79; future of hog industry in Texas, 110-113; each section requires management peculiar to its conditions, 112; packers have no favorite breeds, 112, 113; hogs for the farmer, 110; relation between breeder and farmer, 110; brood sow, 109, 110; feeding hogs for profit, 99-107; green pasturage, 81; hog a grazing animal, 100; high priced corn, 79, 99, 100; cottonseed meal, 108, 109; heavy hogs not profitable, 109, 113; examples of successful hog raisers, 79.

Hogs, showing, object and purpose, 116.

Hog cholera, cause and how spread, 82.

Honey—
extracted and strained honey described, 126, 127; profit in different kinds of honey, 127, 128; storing and granulation, 128, 129, 131; effect of heating honey, 129-131; effect of pure food laws on Texas honey prices, 129, 130; prices of Texas honey, 130, 131; most desirable package for honey, 135; use of shallow supers in production of honey, 124.

Honey house, equipment and construction, 126, 128.

Humus of vital importance to cultivation, 75, 76.

Immigration problem, 21.

Insect pests—
damage done, 15; necessity for State aid in controlling, 15; corn insects, 86, 89.

Insecticides, 88.

Income of average farmer, 23.

Johnson grass—
how to eradicate, 92-95; Johnson grass and alfalfa, 94, 95.

June corn, 68.

Kafir, an addition to our feed supply, 79, 80.

Laguna corn, 68.

Legislation, report of committee on, 32-36.

Life zones of Texas—
mapped by U. S. Biological Survey, 28; their relation to crop zones, 28.

London purple as an insecticide, 88.

Manuring, early application of barnyard manure necessary, 70.

Meat curing methods, 40.

Mexican June corn, 68.

Milking machine, use demonstrated, 43.

Moisture of soil—
soil moisture required for corn, 54; plowing best means of conserving moisture, 69; barnyard manure aids in conserving moisture, 69.

Mushrooms, 43.

Newspapers—
what the farmer expects of them, 11, 12; what they do for the farmer, 11, 12; what the farmer may do for them, 12; advertising, 12, 13.

Oats—
fall vs. spring sowing, 89, 90; rotation in oat belt, 80, 81; immunity from rust, 82; followed by peas, 56.

Orchard, care of, 44.

Ornamentals—
growing demand for, 44, 45; some native ornamental plants, 45-47.

Paris green as an insecticide, 88.

Peanuts—
as a hog feed, 81, 99, 100; improve land, 57.

Peas—
increase fertility of soil, 56, 59; may be sown in corn, and planted on oat stubble, 56; prepare way for alfalfa on sandy soil, 56; curing pea hay, 58; how to induce tenants to plant peas, 57.

Pigs—
care, 96-99; feeding, 96; weaning, 96; pasturage, 97, 106; lice, 99, 114.

Plowing—
when to plow deep for corn, 54; varies in different parts of the State, 59, 60, 69; best means of conserving soil moisture, 69.

Queen rearing, 132, 133; requeening colonies, 121, 122; importance of good queens, 121.

Roads, importance of good roads to the farmer, 15.

Rotation of crops neglected by Southern farmer, 81.

San Antonio fair, prizes for corn, 83.

Scalp bounty law, 35.

School gardens—
  beneficial results of, 19; the place to teach elementary agriculture, 25, 42.

Score card, purpose and value, 83-85.

Seed—
  factors that determine germination, 57; selecting seed for high yields, 60-63; selecting ears of quality for seed corn, 63-65; methods of selecting seed corn criticized, 63; importance of shelling record of seed corn, 65, 66; native grown seed best, 66-68.

Seed bed—
  preparation affects stand, 59, 60; how to prepare seed bed, 59, 60, 69, 70.

Shade trees, native, 45, 47-50.

Show ring, object and purpose, 116.

Soils—
  fertile soil constitutes the great source of wealth of Texas, 30; importance of understanding character of soil, 30; should be taught in public schools, 30; soil best suited to corn growing, 52-56; individuality of each variety, 53; chief peculiarities of good corn soils, 53-55; one crop system ruinous to soils, 18; livestock aids in maintaining fertility, 79; saving Texas soil, 56.

Soil, Bureau of Soils—
  work in Texas, 18; to aid schools in teaching agriculture, 29; requested to furnish an expert to instruct Texas teachers, 30; outline of work, 52, 53; ready to give information, 56.

Southern Cotton Association, co-operation with Farmers' Congress, 33, 36.

Split-log drag, 15.

Stand—
  how affected by preparation of seed bed, 59, 60; depends on germination power of seed, 63, 64; uniform size of kernels necessary if planter is used, 63, 64.

Stock farming taught at A. and M. College, 116-118; stock farming and corn growing, 79, 80.

Tile drainage, 55.

Trees, native, 47-50.